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Berlin *Airlift*

A USAF SUMMARY.....

26 JUNE 1948

30 SEPTEMBER 1949

PREPARED BY:

HEADQUARTERS, UNITED STATES AIR FORCES IN EUROPE



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BERLIN AIRLIFT /

A USAF SUMMARY

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UNITED STATES AIR FORCES IN EUROPE
Office of the Commanding General
A. P. O. 633

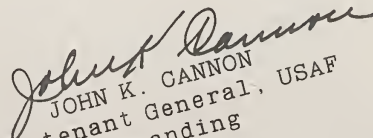
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New York, N. Y.

SUBJECT: Berlin Airlift

TO: Chief of Staff
United States Air Force
Washington 25, D.C.

The Berlin blockade created a need for imagination, joint planning, know-how, and ingenuity, all of which were required to supply by air a city of more than two million people. The successful accomplishment of the Airlift was possible only through the combined efforts of all the Armed Forces and the various governmental and industrial agencies of the Western Democracies.

This summary is the story of our participation in the operation. The problems and their solutions, as shown in this presentation, may be of value in future operational and logistical planning.


JOHN K. CANNON
Lieutenant General, USAF
Commanding

INTRODUCTION

During the period when there was free traffic between the Western zones of Germany and Berlin, approximately 12,000 tons were shipped into Berlin daily by rail, barge, and truck.

Early in April 1948, Soviet guards attempted to search an Army military train enroute to Berlin. To prevent submission of similar shipments to this indignity, the United States resorted for 11 days to airlifting all supplies required to fill Allied needs. Military aircraft were concurrently used to provide transportation for authorized travelers who otherwise would have been subjected to this initial Soviet blockade.

Again on 10 June, the Russians stopped five Berlin-bound coal trains at the British-Soviet Border Control Point because the train papers did not specify the stations at which the trains would stop. This new control measure gave rise to speculation as to whether Soviet authorities might stop all surface traffic from the Western zones to Berlin. Accordingly, the emergency plan for Allied airlift which had been evolved during the April crisis was readied for possible use. On 22 June the Soviet Union took action to suspend all traffic and travel across the Soviet Zone of Occupation.

The suspension of Western zone Berlin traffic virtually created in the Western sectors of Berlin an Allied island

in the Soviet Occupation Zone. The surface blockade permitted official access only by air through three corridors extending from Berlin toward Hamburg and Hanover in the British zone and Frankfurt am Main in the American zone. It was through these narrow air lanes that, on 26 June, the Western nations initiated an airlift not only to supply the Allied agencies of Western Berlin, but also to furnish for the German population of the Western sectors, some 2,500,000 people, minimum daily needs in sustenance and fuel.

The mission of mercy which the Western Allies undertook was a challenge in joint operation, planning, and execution which had not been equaled in time of peace. The following chapters portray the activities of the United States Air Forces in Europe to meet this challenge. The participation of the many other agencies without whose help the Lift could not have been possible is portrayed in other reports, and no attempt is made herein to duplicate their presentation.

For training purposes and simplicity of approach, this presentation is composed of separate chapters for each staff function or activity. The statistics presented, unless otherwise indicated, cover United States operation only.

This report has purposely abstained from glorification of individuals or activities, since such mention of any specific individuals or activities would mean inequitable omission of others also deserving praise.

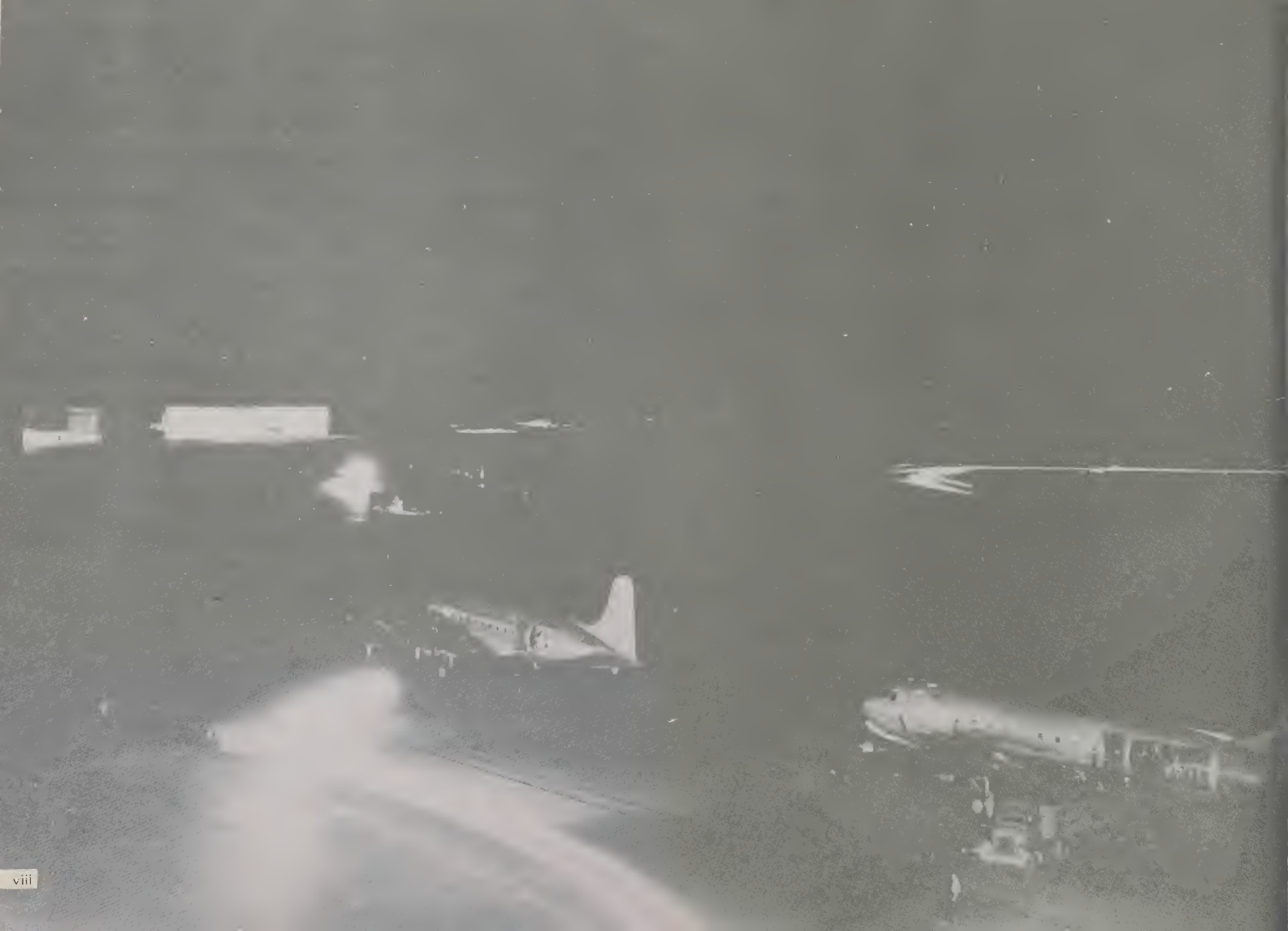
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AIRLIFT BASES

Legend

- ★ — U.S. BASES
- — BRITISH BASES
- ▲ — FRENCH BASES
- — U.S. OPERATED

INTRODUCTION

When it became apparent on 25 June 1948 that supplies would have to be airlifted to Berlin due to the Soviet closure of the last land route into the four-power occupied capital, USAFE was called upon to deliver supplies to Berlin. Aircraft of the 60th and 61st Troop Carrier Groups and other aircraft in the pilot proficiency pool at Wiesbaden were marshalled to perform the task. Except for one or two B-17 flights, all the aircraft initially used were C-47's. As many of these aircraft did not have assigned crews, pilots were detailed for the flying from all types of duties. When the mission gave the indication of lasting more than a few days, a special Task Force was organized to which officers from the Operations Division, Headquarters USAFE were detailed.

During these early days, USAFE personnel were also accomplishing the initial organization and development in England of the 3rd Air Division, which was to direct the training of B-29 groups and be responsible for the Burtonwood Air Depot where Airlift C-54's were later put through 200-hour inspections. Needless to say, the presence of potent U.S. tactical aircraft in England in moderate numbers was a morale booster for both the people of Western Europe and the personnel directly engaged in the Airlift. However, the development of the 3rd Air Division also necessitated an aerial supply build-up from USAFE stocks, and initially this had to be done largely by air with the same C-47's being used on the Airlift to Berlin.

The fact that one type route to the besieged city was not closed — the 20 mile wide air corridors — was due to wise diplomatic tactics in 1945 when the quadripartite agreement was negotiated defining the corridors and granting their free use under established rules. This agreement effected the necessary coordination of operations of the four nations' aircraft in Berlin by creating a four-power Air Safety Center where all flight notices were posted. In March of 1948, the Russians requested that the agreement be modified on the basis that several alleged infringements of its provisions by U.S. aircraft had been noticed. Had these modifications been agreed

upon by the Western Powers, the Airlift could never have existed as no longer would night flying or instrument flying have been permitted through the corridors in and out of Berlin. But the proposals were flatly rejected by the Western Powers. This proposed curtailment of Western air rights, combined with other disagreements and unfriendly Russian statements, acts, and demands, should have provided basis for suspecting the imposition of more drastic measures by the Russians, designed to force the other three occupying powers from Berlin by placing them in an untenable position in which there existed no positive and continual means of transportation to and from the city.

To perform aerial supply exclusively for a civil metropolis is an entirely different project from fulfilling military requirements with airlift to a theater of operations or an isolated unit. In contrast to a Table of Allowance and prescribed levels of supply for a military organization, a city's requirements are limitless. It was therefore initially necessary to establish the minimum amount of supplies required to sustain the life of the civilian and military population and provide the city's essential industries with sufficient materials for partial operation. This basic requirement was set at 4,500 tons per day, and



THE C-47 WAS THE INITIAL AIRLIFT WORKHORSE.

strict rationing within Berlin was instituted. However, the directive calling for the airlifting of **minimum** tonnage requirements was later changed to airlift the **maximum** tonnage possible. Nothing was to be airlifted which was not requested by the Air Staff Committee in Berlin.

To support the Airlift to Berlin it was estimated that a fleet of 225 C-54's would be required. This necessitated the marshalling of these aircraft with crews from other USAF commands all over the world. Some units were transferred in their entirety from their permanent duty stations to bases in Germany. By the end of September 1948, all C-54 units were in place and operational in the Airlift. A flight of C-82's was also present to move specialized cargo to and from Berlin.

Originally the USAF flew from its two major bases in the Frankfurt area — Rhein/Main and Wiesbaden. However, as the project grew, other bases were necessary because of the ground and air traffic in the Frankfurt area. RAF bases in the British zone at Fassberg and Celle were assigned to the USAF for its use. Operationally, all of these bases were well situated near the entrances to the corridors and near the supply points for the commodities hauled. The original USAF terminal base in Berlin was Tempelhof, but later Tegel Airfield was constructed in the French sector and operated by the USAF. These various installations are discussed in more detail in a later chapter.

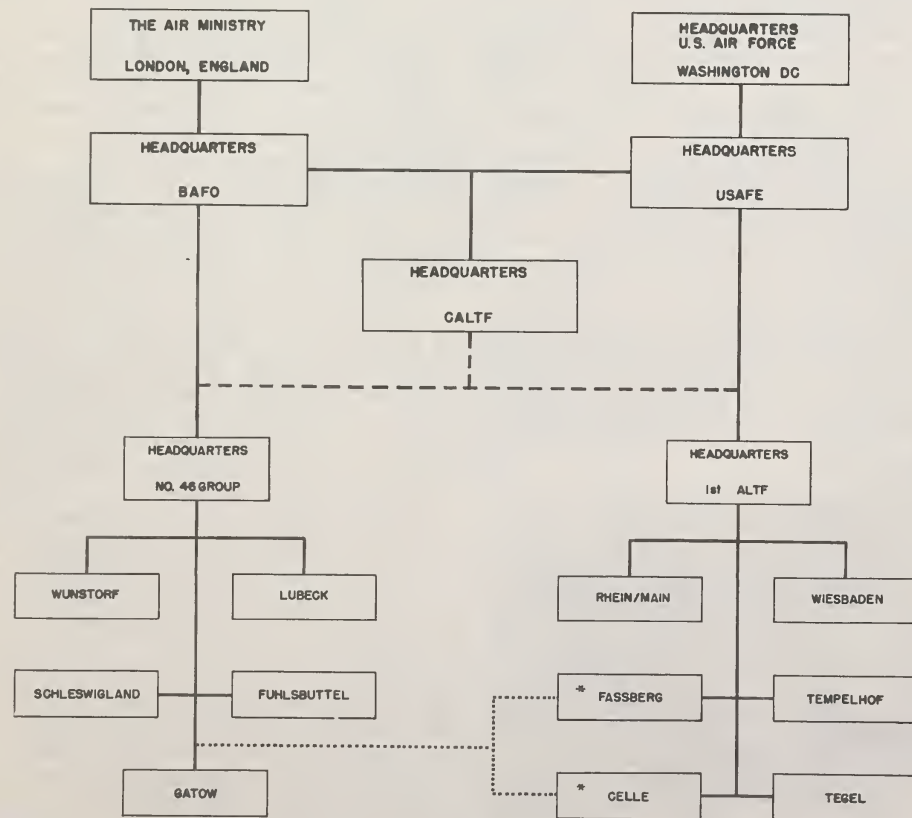
At the inception of the Airlift, standard navigational aids existed in the terminal areas and along the routes used. With precision navigation and flying procedures required for intense operations from congested areas through narrow corridors, other aids were required. Additional beacons were positioned to indicate turning or reporting points. Four Visual-Aural radio ranges (VAR) were installed to delineate accurately the air corridors. One localizer was installed to indicate a definite position fix for reporting purposes, and the installation of CPS-5 surveillance radar at Tempelhof provided radar air traffic control in the Berlin area. The system of navigational aids which existed at the end of the Airlift is part of communication projects discussed in greater detail in a special section on that subject.

ORGANIZATION OF

The American Airlift effort began as an operational activity of Headquarters USAFE. It was designated first as Headquarters, Berlin Airlift Task Force and was later established as the Airlift Task Force (Provisional), effective 29 July. The provisional status was removed 4 November with the official establishment of the 1st Airlift Task Force (1st ALTf).

Initially, U. S. and British efforts were independently conducted. Early in the operation, however, it was realized that some form of unified control was necessary in order to coordinate the RAF-USAF effort. When the subject was first discussed, there was a slight difference of opinion as to how far the integration of command should go. While one group believed that coordination of air traffic control matters was all that was necessary, the other held that one officer should be charged with the overall operational control.

The discussion between the Headquarters of the United States Air Forces in Europe (USAFE) and British Air Forces of Occupation, Germany (BAFO) resulted in the establishment 15 October 1948 of the Combined Airlift Task Force (CALTF) as an integrated subordinate command of both USAFE and BAFO. Due to effort involved, the Commanding General of the U. S. element was selected as the Commander of the combined organi-



AIRLIFT OPERATION AT TEMPELHOF.



THE BERLIN AIRLIFT

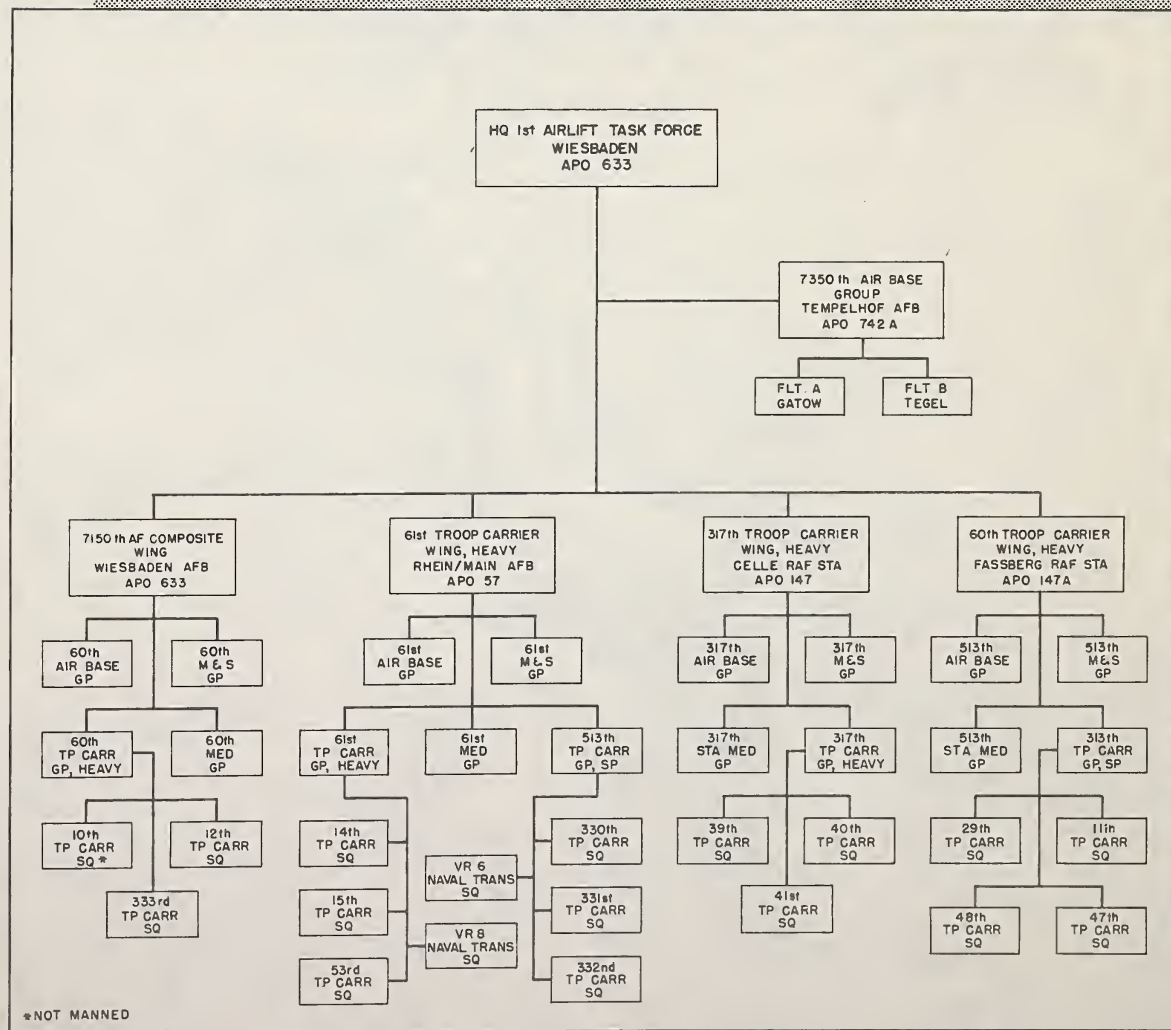
ization, with the Air Officer commanding the RAF element as his deputy. CALTF was given operational control of all participating units. Administrative responsibility remained respectively with the American 1st ALTF and the British 46th Group.

ARMY SUPPORT

The U. S. Commander-in-Chief, European Command, charged the Army Forces in Europe with the responsibility for furnishing all supplies for Berlin, establishing railheads, receiving supplies at the terminal points, and handling and transporting the supplies from the railhead to the airplane, and from the airplane to ultimate destination. Effective execution of these functions was facilitated by an Army liaison representative at Headquarters 1st ALTF and, later, by organization of the Army Airlift Support Command, consolidating all U. S. Army activities under one Army commander.

NAVY PARTICIPATION

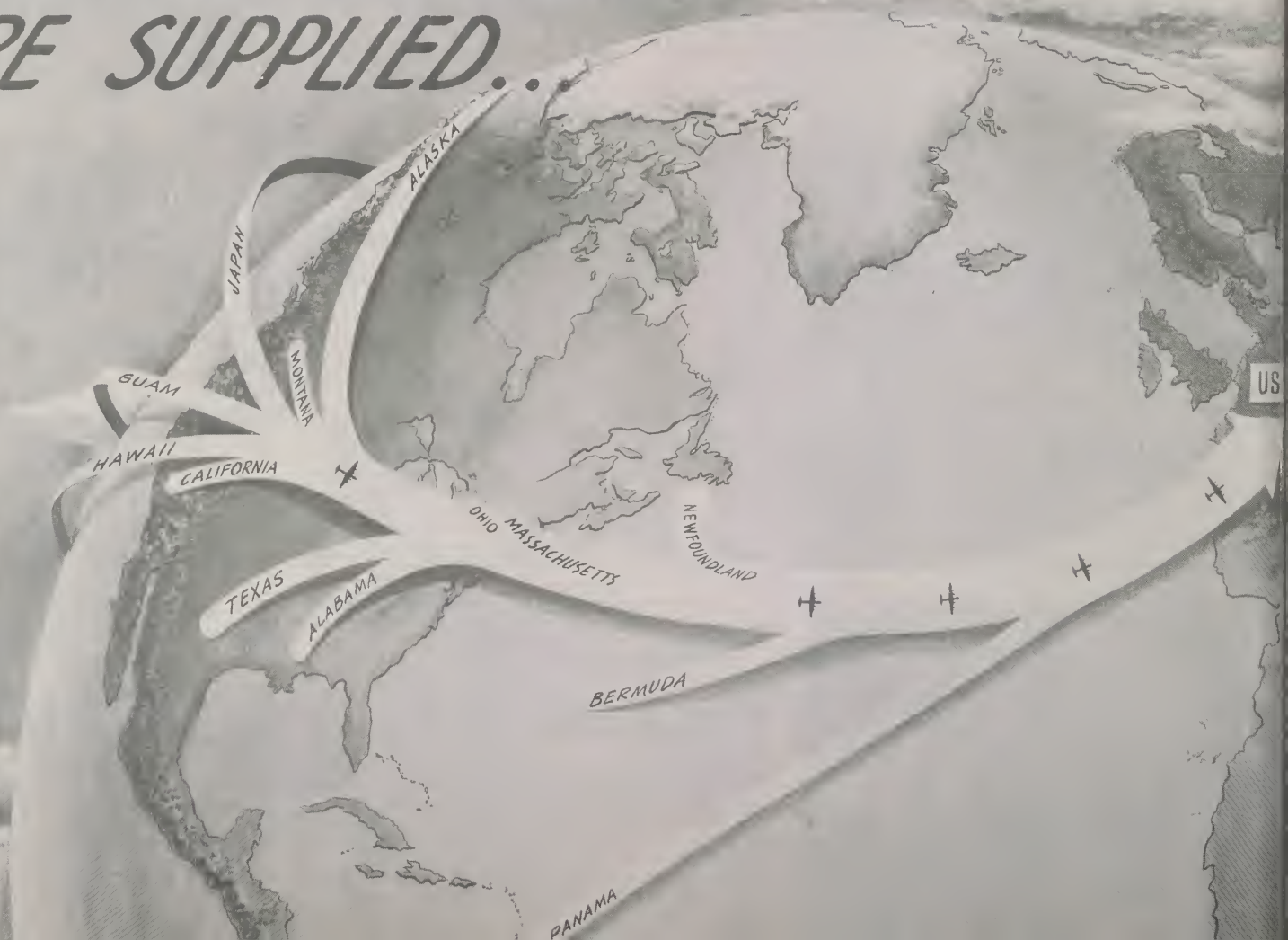
Two Naval units flew from Rhein/Main Air Base as integral parts of the operation. Naval Transport Squadrons VR-6 and VR-8 were attached to the 513th and 61st Troop Carrier Groups, respectively, and operated under the control of the group commanders. The squadrons were provided with logistical support and housing in the same manner as USAF Airlift units.



NIGHT OPERATIONS AT FASSBERG RAF STATION.



REQUIRED AIRCRAFT WERE SUPPLIED..



MANPOWER *and* REQUIREMENTS

T/O & E 1-7012
TABLE OF ORGANIZATION AND EQUIPMENT
 No. 1-7012
 DEPARTMENT OF THE AIR FORCE
 HEADQUARTERS, UNITED STATES AIR FORCE
 WASHINGTON 25, D. C., 24 March 1945
HEADQUARTERS, MAINTENANCE AND SUPPLY GROUP
 This table will not become effective except upon specific authorization by the Department of the Air Force

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Engineer.....	8
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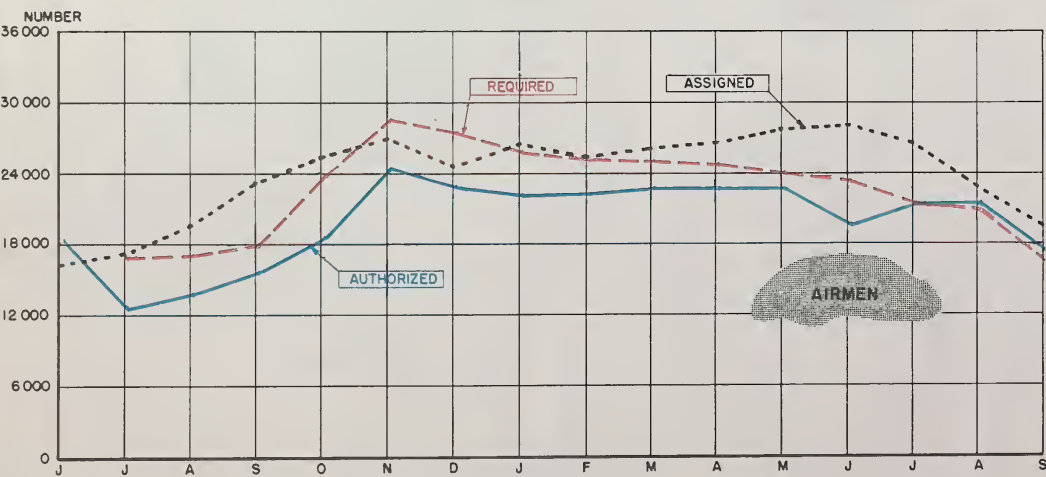
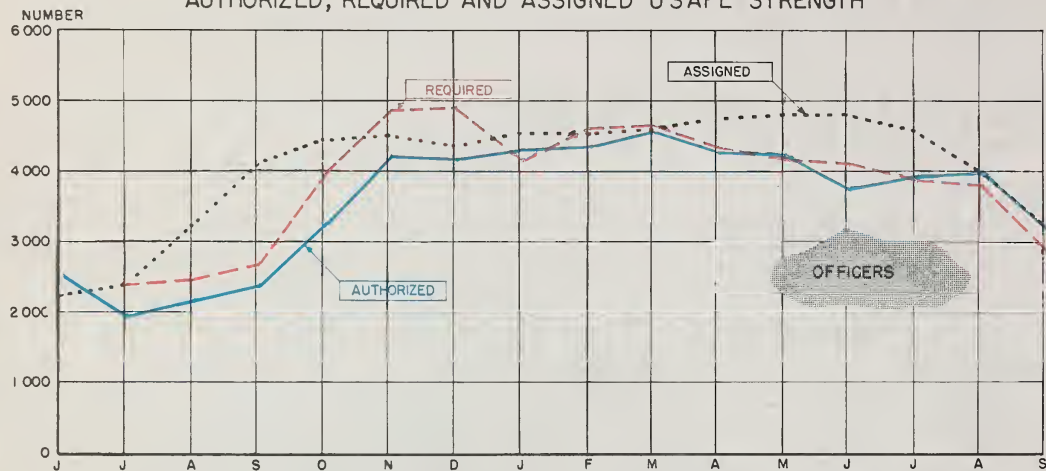
T/O & E 1-1312
TABLE OF ORGANIZATION AND EQUIPMENT
 No. 1-1312
 DEPARTMENT OF THE AIR FORCE
 WASHINGTON 25, D. C., 24 March 1945
HEADQUARTERS, TROOP CARRIER GROUP
 This table will not become effective except upon specific authorization by the Department of the Air Force

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Section I
GENERAL
 1. Function.—To provide command and staff supervision over the combat squadrons of the troop carrier group, and attached units.
 2. Assignment.—Normal assignment is to the combat zone. This head-



AUTHORIZED, REQUIRED AND ASSIGNED USAF STRENGTH



MANPOWER

It was evident from the beginning that the T/O&E of a Troop Carrier Wing (Heavy) did not authorize sufficient personnel for 24-hour operation seven days a week. Therefore, in October 1948 the flight crew authorization were augmented to three crews per aircraft. Since additional maintenance and supply personnel and personnel for base operation were also required, Headquarters USAF authorized the reorganization from the "P" Column to the "W" Column strength of the T/O&E on 20 January 1949. Even at the increased strength authorization, a requirement existed for additional authorization in the maintenance categories. A comparison of these requirements is indicated in the accompanying table.

The reorganization to the "W" Column strength of the troop carrier T/O&E made it apparent that many of the SSN's authorized were surplus and that reports to Headquarters USAF depicted an erroneous picture. Some of the surplus authorizations that were noted are as follows.

- (1) Navigators (SSN 1037). Flights to Berlin did not require navigators. However, flights to Burtonwood and the Zone of Interior (ZI) required complete crews. Only 90 navigators for the entire Airlift were needed, while the T/O&E authorized 984.
- (2) Radio operator mechanics (SSN 2756). Not required for Airlift flights.
- (3) Cook's helpers or mess attendants (SSN 062). All



of the authorization was surplus, as German civilians were utilized for such duties.

- (4) The Base Service Squadrons of each wing were surplus. The authorization therefor consisted primarily of laborers, and German nationals were utilized in that capacity.

In late February 1949 requests were submitted to Headquarters USAF to reorganize to "P" Column strength, delete surplus SSN's from the T/O&E's, and inactivate the base service squadrons. Spaces made available were to be converted on a grade-for-grade basis, to the USAFE non-T/O&E allotment. These requests were approved the following April and the corresponding reorganization was directed in May.

A problem of major concern was that the USAFE Troop Basis did not increase concurrently or commensurately with the additional requirements. The accompanying chart indicates that requirements continuously exceeded the authorized personnel; e. g., in October 1948 the requirement for both officers and airmen was almost double the authorization. This made planning particularly difficult in that an all-out effort was required of every organization without any advance or current information on authorizations.

The disparity in authorizations was alleviated by the utilization of German nationals. Qualified personnel of this type were obtained whenever possible and utilized as mechanics' helpers and in normal base support activities where military personnel were not authorized in sufficient numbers.



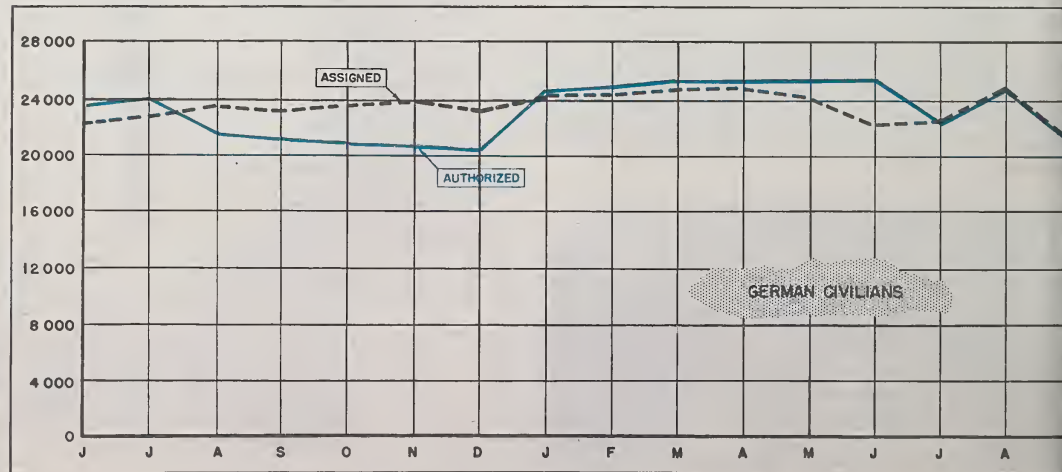
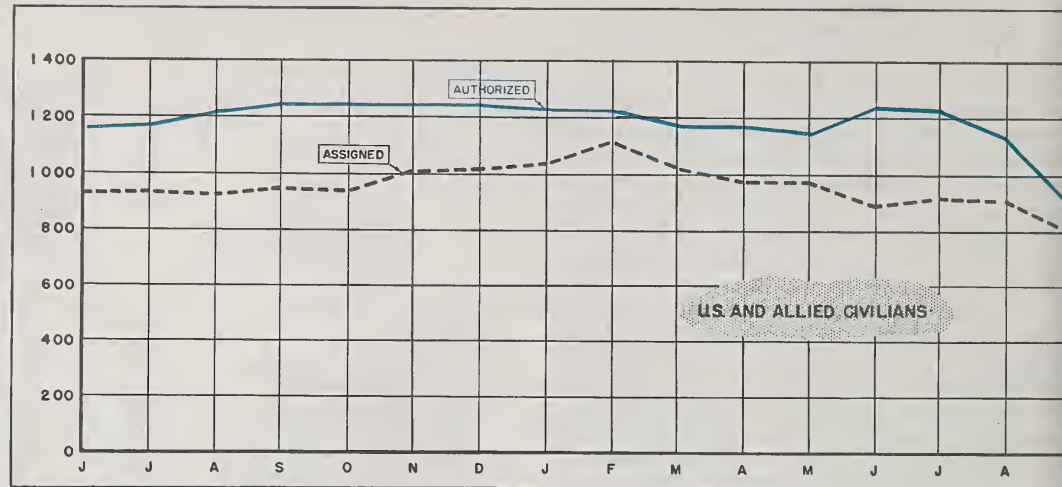
AN ANALYSIS OF MAINTENANCE PERSONNEL REQUIREMENTS

JOB TITLE	SSN	Authorized by Col. 6 T/O&E 1-1313 (U.E of 12 4-Eng acft plus 3 in reserve - war column)	Included in T/O&E 1-1313 for orgn maint of 3 reserve acft	T/O&E 1-1313, orgn maint personnel authorized for 12 4-Eng aircraft (50 hr flying monthly)	USAF Manpower Guide, orgn maint personnel required for 12 4-Eng acft (50 hrs flying monthly)	USAF Manpower Guide, orgn maint personnel required for 12 4-Eng acft (240 hrs flying monthly)	Difference between authorizations and requirements for orgn maint for 12 4-Eng acft (240 hrs flying monthly)
		A	B	C (A-B)	D	E	F (E-A)
Painter	144	1		1	1	2	+ 1
Clerk-Typist	405	1*		1	1	3	+ 2
Airplane Hydraulic Mechanic	528	3	1	2	1.92	4.18	+ 1.18
Fabric & Dope Mechanic	548	2		2			- 2
Airplane Sheet Metal Work	555	4		4	2.4	5.14	+ 1.14
Aircraft Welder	573				1.32	2.82	+ 2.82
Airplane Power Plant Mechanic	684-A	30	6	24			- 30
Airplane Electrical Mechanic	685	5	1	4	3	6.42	+ 1.42
Airplane Instrument Mechanic	686	5		5	1.92	4.18	- 82
Airplane & Engine Mechanic	747-C	28	3	25	72	154.08	+ 126.08
Airplane Inspector	750-C	2		2	2	6	+ 4
Airplane Line Chief	750-C	1		1	1	1	
Airplane Flight Chief	750-C	3		3	3	3	
Airplane Crew Chief & Assistant	750-C	15	3	12	24	51.36	+ 36.36
Radio Mechanic, AF	754	5	1	4	12	25.68	+ 20.68
AF Supply Technician	826	3		3	2	5	+ 2
Supply Clerk	835	1*		1	1	3	+ 2
Radar Mechanic, Troop Carrier	849	9		9			- 9
Radar Mechanic Navigator	853	10	1	9			- 10
Special Vehicle Operator	932				1	2	+ 2
Radio Operator-Mechanic	2756	24		24			- 24
Total		152	16	136	130.56	278.86	+ 126.86

* Personnel in squadron headquarters not included.

Based on 201 4-Engine aircraft, a requirement exists for 2,123 additional personnel for organizational maintenance with supporting administrative personnel. Field maintenance, based on 27% of 2,123, would require 573 personnel or a total of 2,696 additional for both organizational and field maintenance. Deducting 784 used in 200-hour inspection at Burtonwood, a requirement existed for 1,912 additional troop spaces for "Vittles" maintenance and troop carrier squadrons.

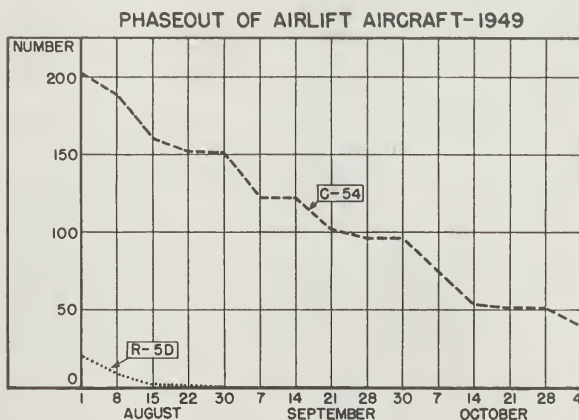
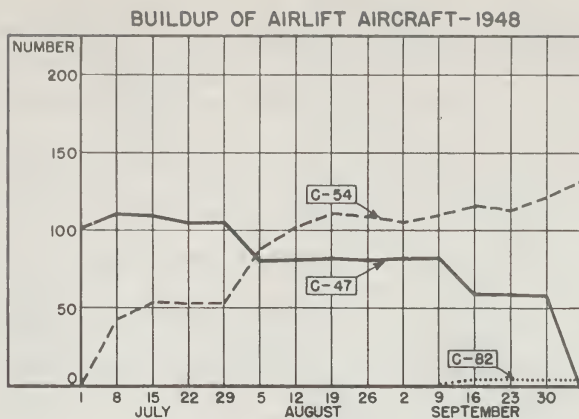
U.S., ALLIED AND GERMAN CIVILIAN PERSONNEL STRENGTH



AIRCRAFT

As has been pointed out, the 60th and 61st Troop Carrier Groups were initially charged with flying the maximum possible number of missions to Berlin. By 30 June 1948, 102 C-47's were available for the operation. But the establishment of a combined goal of 4,500 tons a day for support of the Western sectors of Berlin made it apparent that the 2 1/2 ton capacity of the C-47 was not adequate for the operation. By 1 July the addition of two C-54's to the fleet marked the beginning of a heavy transport fleet which by 1 January 1949 had grown to 201 USAF and 24 Navy aircraft. The accompanying chart portrays the gradual build-up of C-54's and the retirement of C-47's on the Airlift.

On 16 September 1948 five C-82 aircraft arrived in the command. Carrying unwieldy cargo, such as heavy equipment and automobiles, became their primary function. In November, Navy Squadrons VR-6 and VR-8 began operations with 24 R-5D (C-54 type) aircraft. After the fleet had been built up to 225 aircraft, the available aircraft engaged in the mission varied between 209 and 228 until final phase-out. In addition, a steady pipeline flow of some 100 C-54's into ZI reconditioning depots



and back to the command was maintained until the phase-out of the operation.

When the phase-out began 1 August 1949, 204 C-54's (USAF) and 21 Navy R-5D's were on hand. Forty-five of these aircraft were withdrawn from the available list for return to the ZI. The accompanying chart shows the reduction phase of the operation.

After the official termination of the Airlift on 1 October 1949, the C-54 aircraft were reduced to the number authorized for one Troop Carrier Group (H).

RECOMMENDATIONS

The wing-base organization was used in "Operation Vittles" and proved satisfactory. The Troop Carrier Wing T/O&E authorizing 1 x Column 5 (column "P") is adequate with augmentation for additional crews, maintenance and supply personnel, and additional base support personnel for the augmented strength and support of dependents.

A major item of concern in an extensive air operation should be the reporting responsibility of the aircraft. In this case, such responsibility was retained in a command other than the command requiring and using the aircraft. As a result, for the first five months of operation all statistics pertaining to the C-54 aircraft were reported to the parent commands of the aircraft. Parent commands had to be contacted for the using command to obtain these records. This always resulted in delays and often in inaccurate information.

When it has been established that the operation will be of more than 90 days' duration, and when two factors have been established — (1) the tonnage required, and (2) the most suitable aircraft to transport the tonnage — the accountability of the aircraft should be transferred to the using command as the aircraft are delivered. This accountability should include the pipeline aircraft coming from or returning to depots for reconditioning. The maximum required number of aircraft should be determined, and the operation adjusted to the availability of these aircraft.

Support aircraft which deliver supplies to the command of operations should be accountable to the command directing their activities, and aircraft required for Zone of Interior training schools should be accountable to the command providing the training.

When the total number of aircraft available for all operations is limited, the Department of the Air Force should direct adjustments between commands. For a sustained operation it is necessary that replacement aircraft from manufacturers, or leased aircraft from civilian agencies, be made available to all commands concerned, to meet backlogs due to accidents, weather, and unscheduled maintenance.

SCENE FROM A TEMPELHOF HANGAR.

SUMMARY OF COMBINED OPERATIONS

TOTAL INBOUND TONNAGE	23255096	1404.0	69005.7	119002.6	139622.9	147580.8	113587.9	141438.1	171959.2	152240.7	196160.7	235363.7	250818.5	240325.0	253090.0	77758.6	16151.2
U S TOTAL	1783572.7	1199.0	39971.	73658.1	101846.7	115792.2	87979.3	114567.2	139218.8	20394.6	154475.0	189957.2	192271.4	182722.9	201532.2	55940.0	12047.1
FOOD	296319.3	1100.0	26825.	21424.0	25506.1	27592.1	23043.0	36634.5	16386.6	19548.1	25445.1	30134.2	30032.6	11614.6	10334.	0	0
COAL	1421118.8	0	12426.	50074.0	70910.2	82508.4	60550.8	71923.4	117888.6	95927.1	122602.2	150332.4	153220.1	167007.7	198483.3	55276.5	11988.1
OTHER	66134.6	99.0	720.	2160.1	5430.4	5691.7	4385.5	6009.3	4943.6	4919.4	6427.7	9490.6	9018.7	4100.6	2015.5	663.5	590.
BRITISH TOTAL	541936.9	205.0	29034.7	45344.5	37776.2	31788.6	25608.6	26870.9	32740.4	31846.1	41685.7	45406.5	58547.1	57602.1	51557.8	21818.6	4104.1
FOOD	240386.0	205.0	19917.0	14549.9	19994.2	16934.4	17439.5	17786.0	17337.0	15545.5	18047.0	18251.8	24512.0	21929.1	14711.0	3226.6	0
COAL	164910.5	0	7511.8	27269.8	14591.4	10570.6	3310.7	3587.8	6216.5	5178.0	8621.0	7126.1	10091.4	14619.0	25124.3	16988.0	4104.1
OTHER	136640.4	0	1605.9	3524.8	3190.6	4283.6	4858.4	5497.1	9186.9	11122.6	15017.7	20028.6	23943.7	21054.0	11722.5	1604.0	0
TOTAL OUTBOUND TONNAGE	81730.8	0	1439.4	1806.0	3622.4	3625.7	6446.7	9480.8	7106.1	6109.2	7952.0	9897.9	8295.8	7727.5	6527.4	1646.9	47.0
U S TOTAL	45887.7	*	*	*	*	*	3234.8	5768.7	4128.5	3181.2	4631.0	6488.9	6149.8	5346.5	5488.4	1469.9	*
BRITISH TOTAL	35843.1	0	1439.4	1806.0	3622.4	3625.7	3211.9	3712.1	2977.6	2928.0	3321.0	3409.0	2146.0	2381.0	1039.0	177.0	47.0
TOTAL PASSENGERS AIRLIFTED	227655	4106	16498	12282	14665	17544	18441	18937	16620	15447	19743	18885	16660	10584	10354	10077	6812
U S INBOUND	25263	0	1408	1321	1441	1858	2359	1713	1871	1736	1993	2058	1850	1822	1587	1254	992
BRITISH INBOUND	34815	1925	3157	1965	2230	3120	2565	2760	2905	2602	3092	3258	2429	1336	693	453	325
U S OUTBOUND	37486	531	6262	2764	2897	2711	2491	1944	1729	1812	2576	2694	2489	2151	1877	1435	1123
BRITISH OUTBOUND	130091	1650	5671	6232	8097	9855	11026	12520	10115	9297	12082	10875	9892	5275	6197	6935	4372
TOTAL FLIGHTS	277569	500	13528	18142	19729	18235	13352	16492	19492	17086	22163	26026	27718	26545	27592	8984	1985
U S FLIGHTS	189963	474	7550	9770	12904	12135	9047	11660	14095	12043	15530	19130	19366	18451	20488	5886	1434
BRITISH FLIGHTS	87606	26	5978	8372	6825	6100	4305	4832	5397	5043	6633	6896	8352	8094	7104	3098	551
MONTH	TOTAL	JUN-48	JUL	AUG	SEP	OCT	NOV	DEC	JAN-49	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP

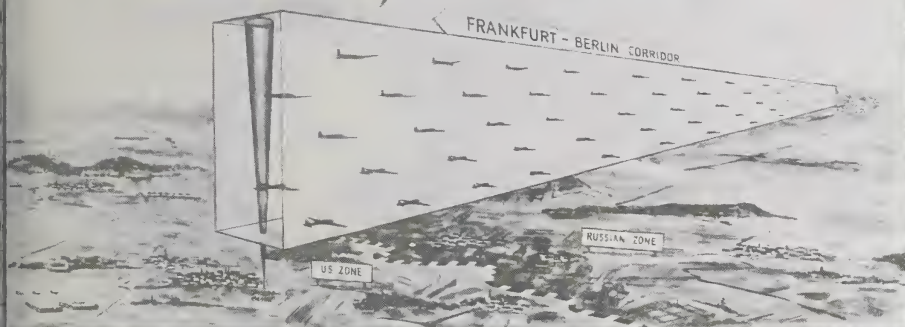
* UNAVAILABLE

LOADING BASE



OPERATIONS *and* PROCEDURES

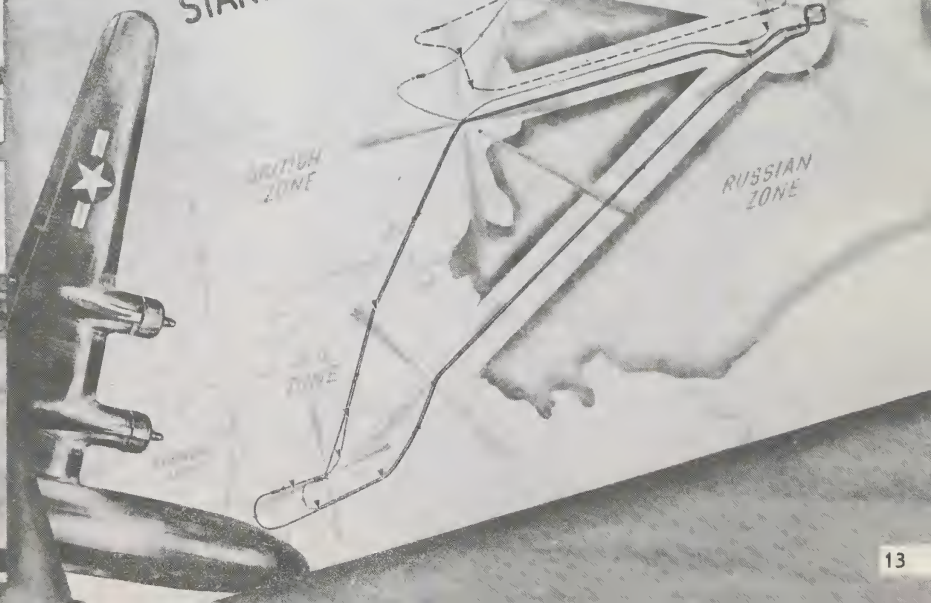
CORRIDOR *Flight Pattern*



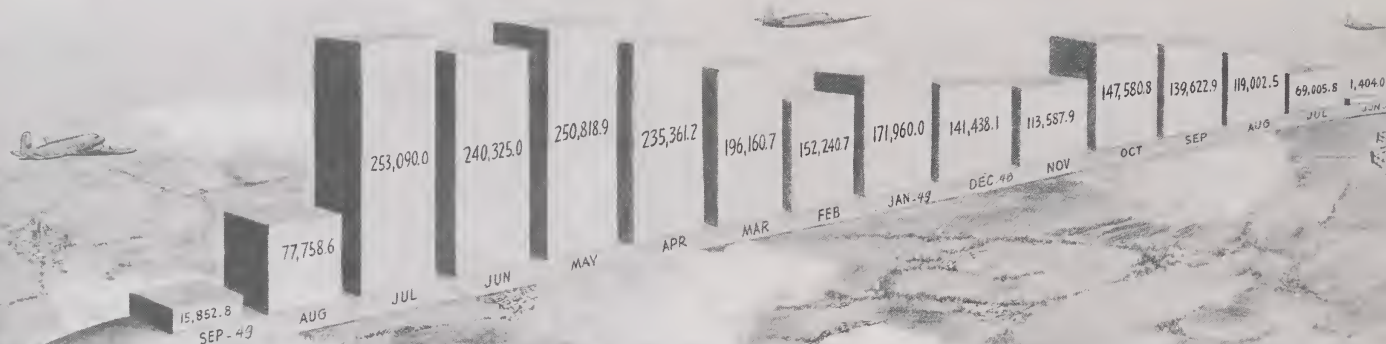
UNLOADING BASE



STANDARD PATTERN OF OPERATION



Monthly *CALTF* TONNAGE flown to *BERLIN*

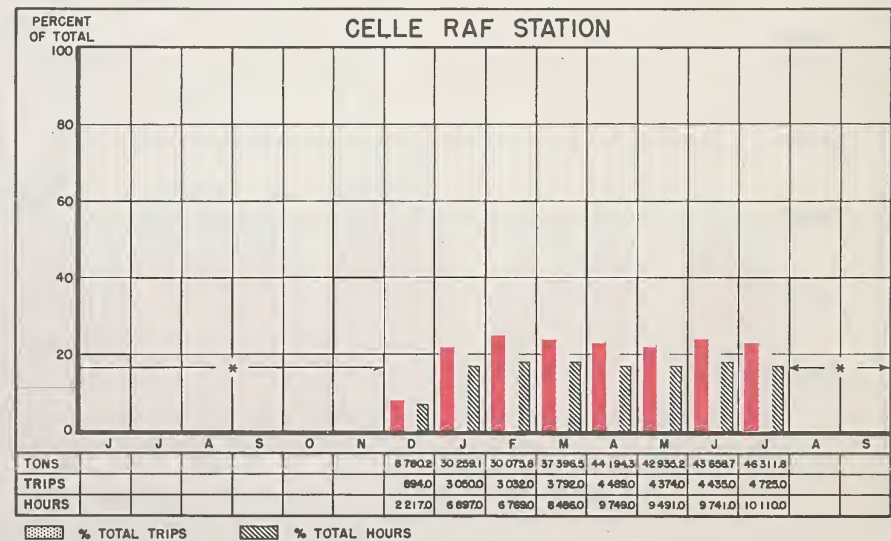
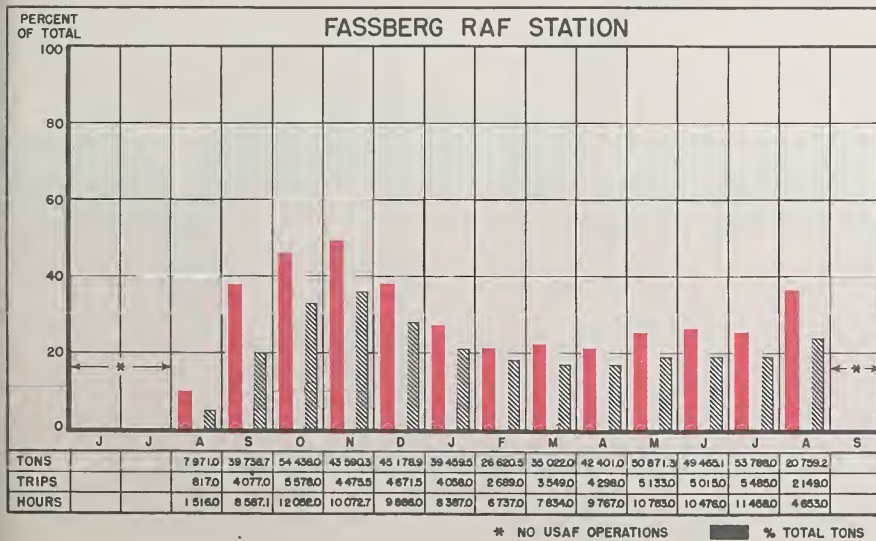
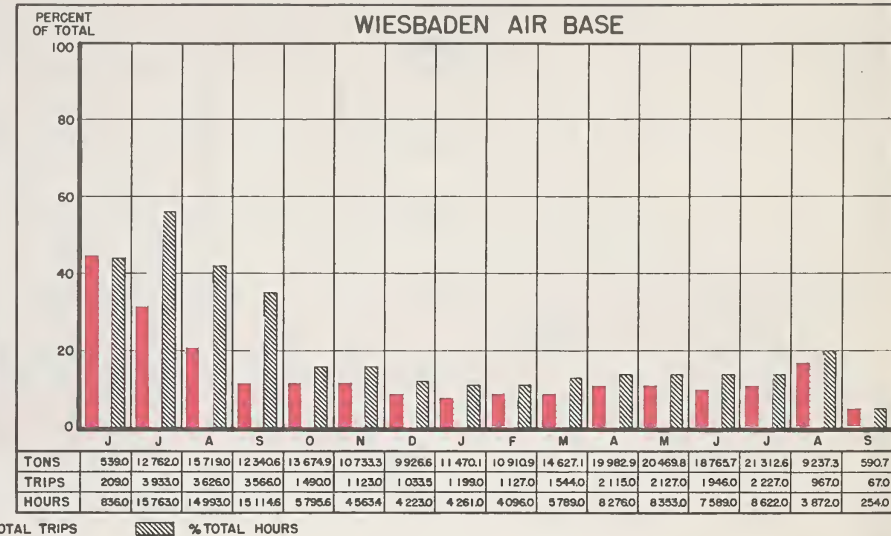
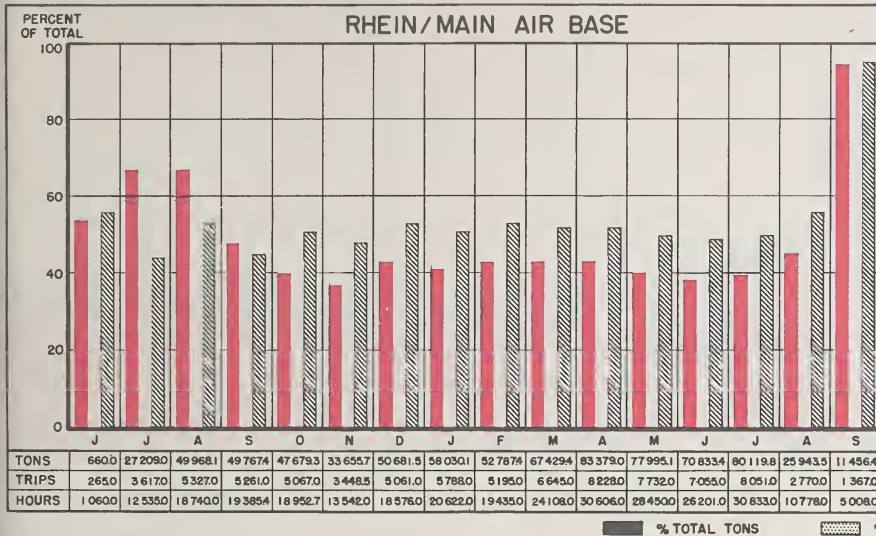


INTRODUCTION

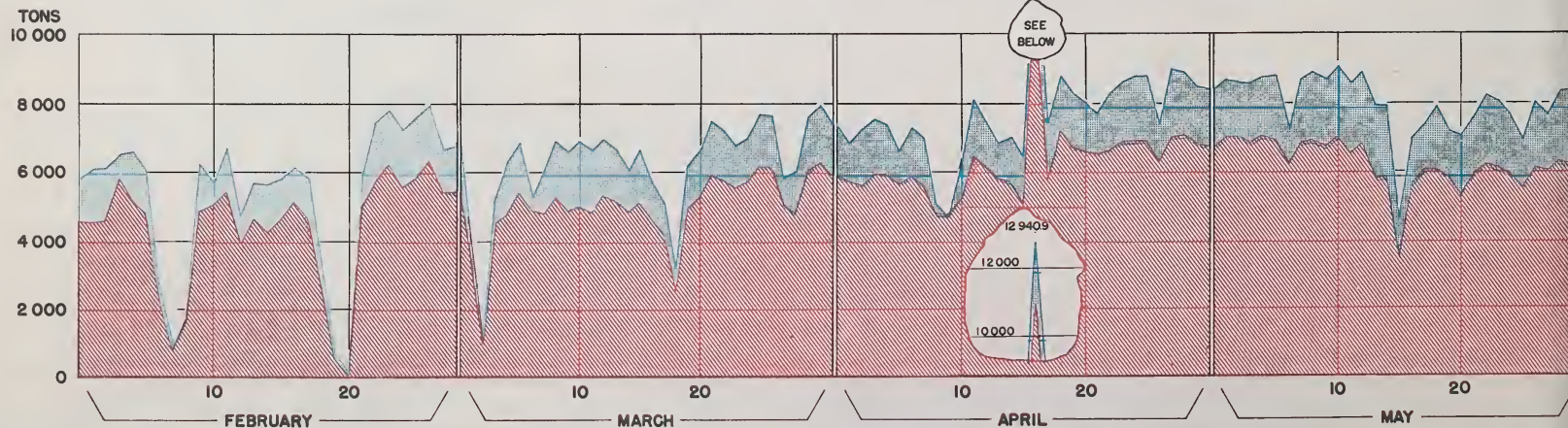
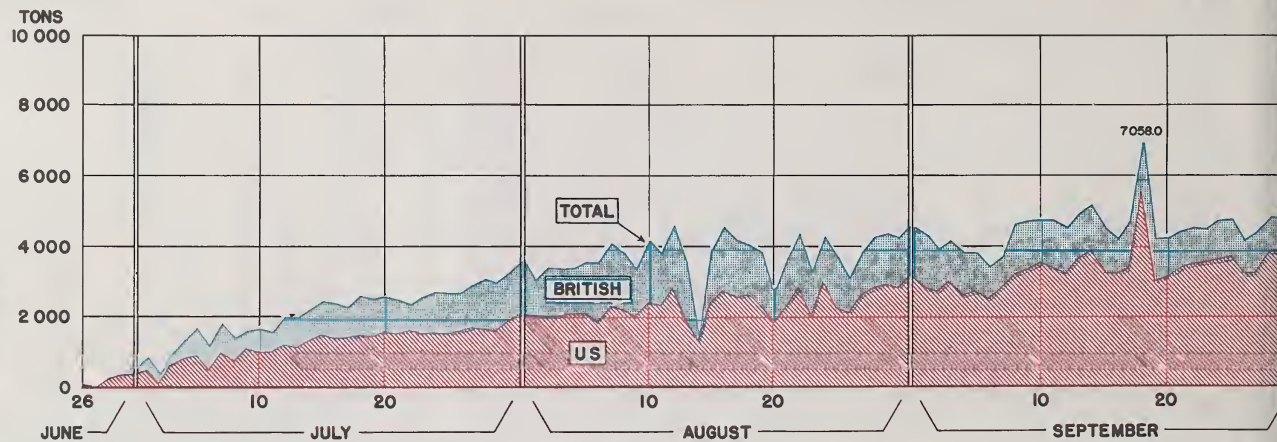
The mission accomplishment of the Airlift is reflected adequately by a total of 2.3 million tons of food, fuel, and supplies transported to Berlin. During the life of the mission, the USAF units primarily carried the bulk-type tonnage, while the British excelled in hauling specialized commodities such as liquid fuels. It should be borne in mind in making comparisons of the effort, that the tonnage goals established early in the Airlift for the American participation were based almost exclusively upon the C-54 capacity of 10 tons, while the British used various types of aircraft with different cargo capacities.

The following charts not only depict the amount of food, coal, and other supplies that were carried into Berlin, but also furnish an indirect portrayal of the build-up of the Lift, and of weather and other factors that affected it.

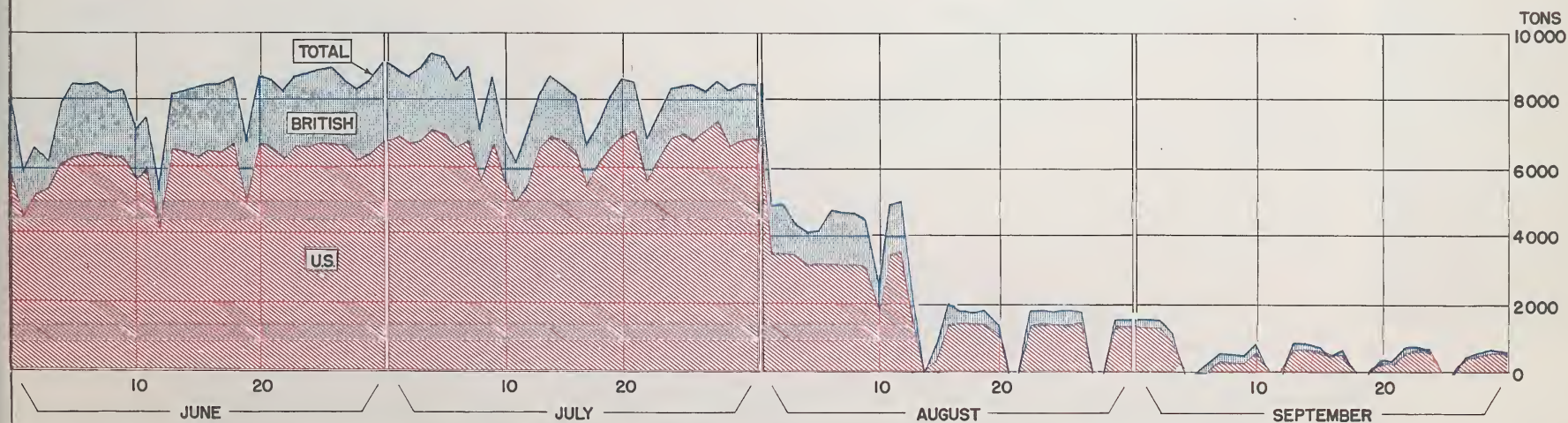
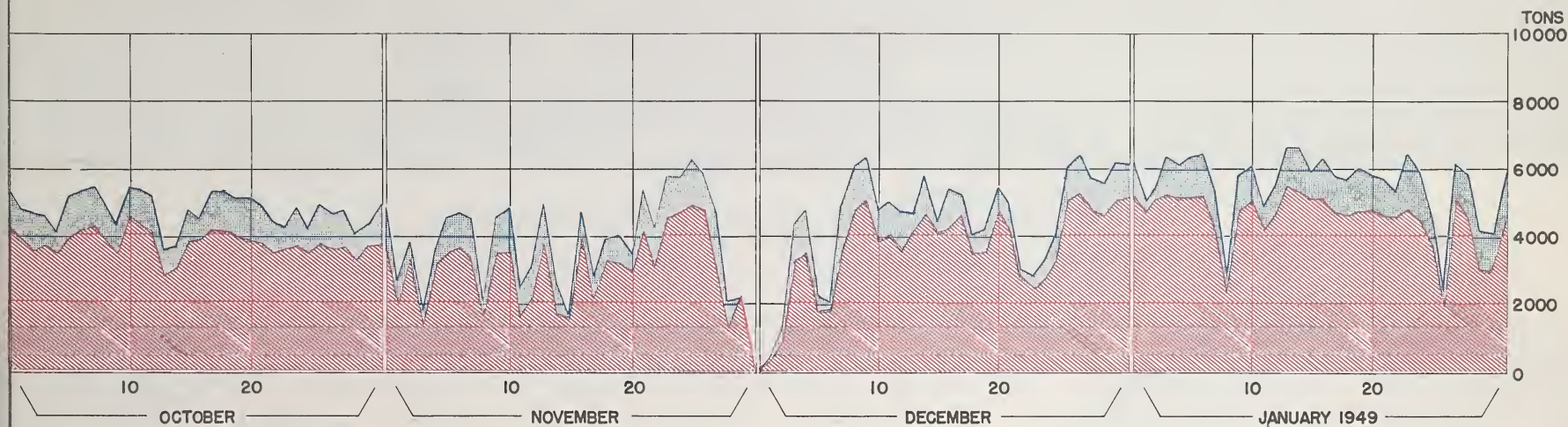
USAF OPERATIONS



AIRLIFT TONNAGE

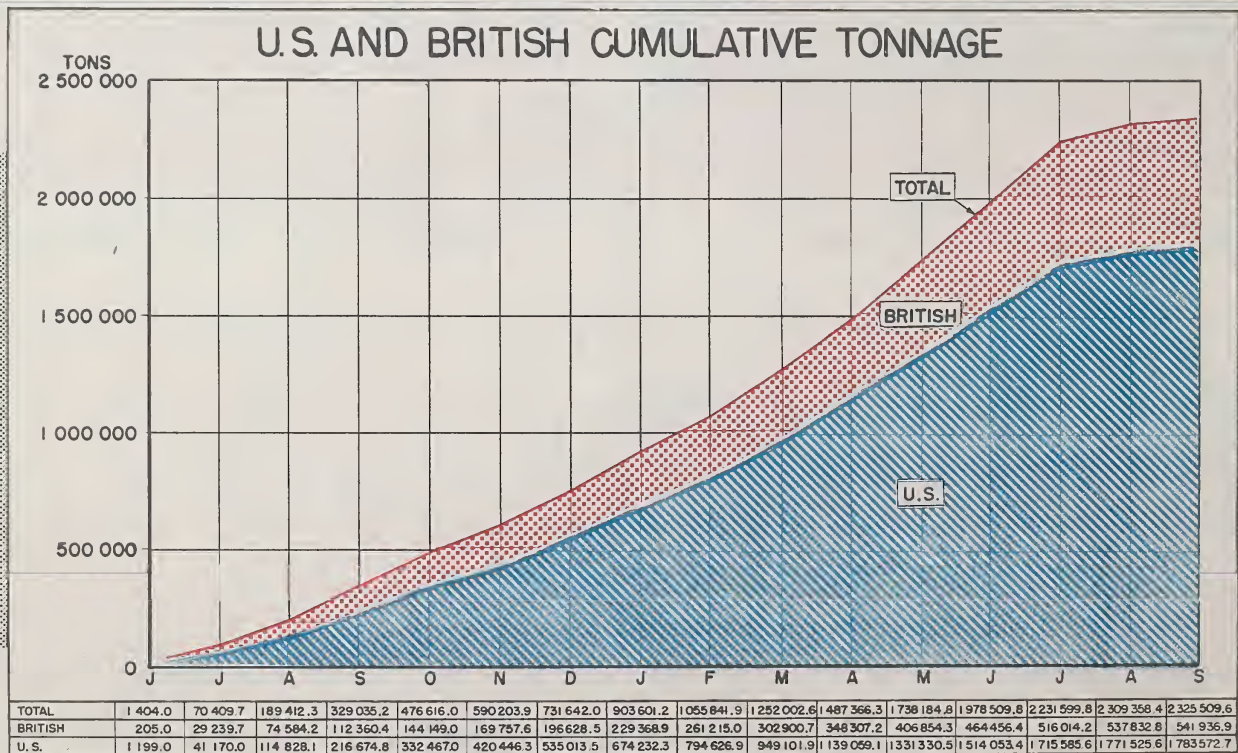


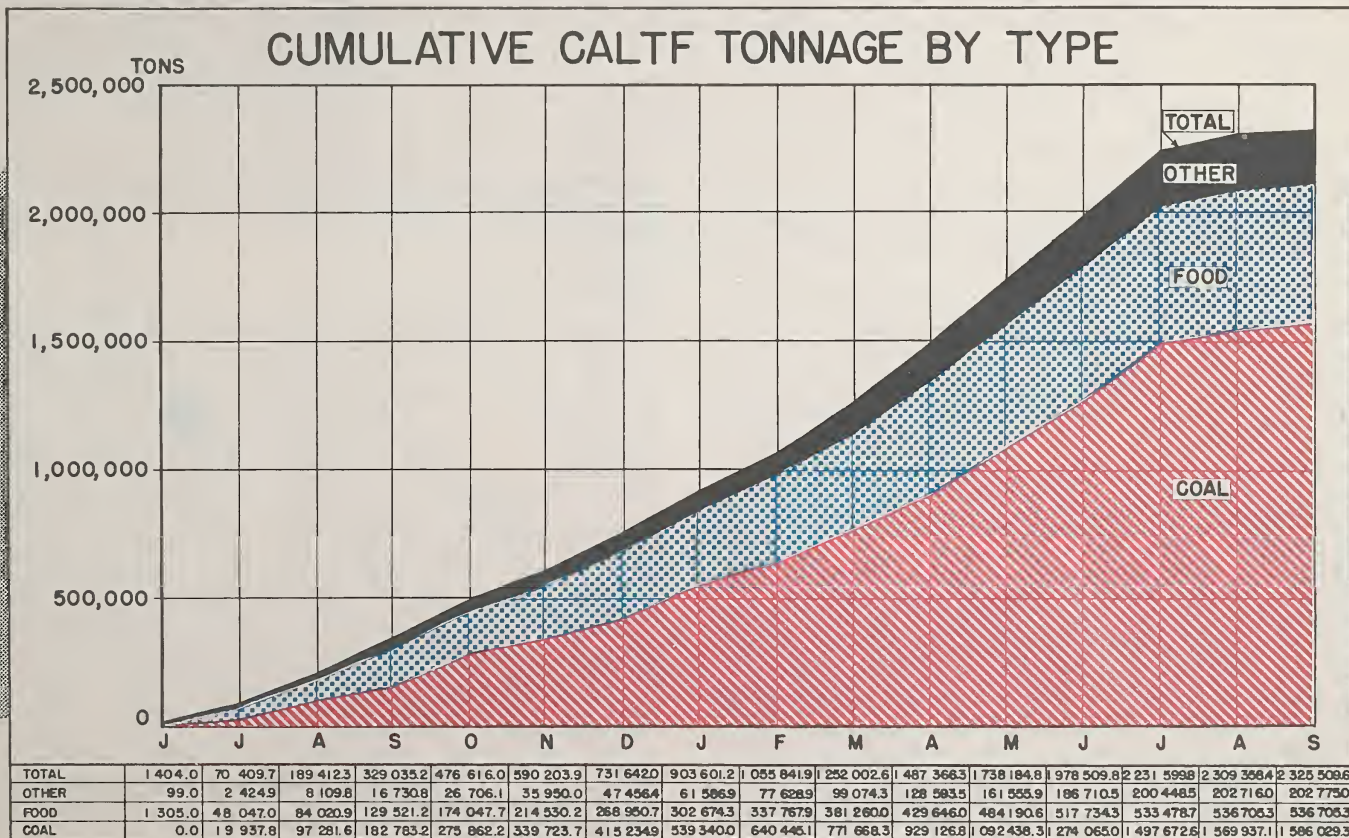
DAY - BY - DAY





PRECISION FLIGHT PROCEDURES UNDER INSTRUMENT
FLIGHT RULES.





THOUSANDS OF
HOURS

MONTHLY FLIGHT TIME BY TYPE AIRCRAFT



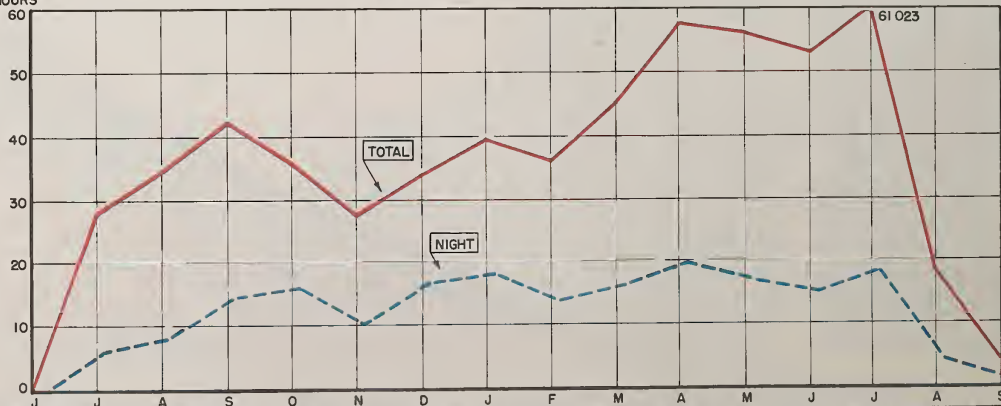
C-47	1896.0	20510.0	13505.0	14782.0	76.0	REPLACED BY C-54 AIRCRAFT									
C-54	7788.0	21717.0	27925.5	36303.0	27873.0	34716.0	39924.0	36798.0	45780.0	57877.0	56532.0	53436.0	60636.0	19303.0	5262.0
C-82				332.6	421.3	305.1	186.0	243.0	239.0	437.0	521.0	545.0	571.0	387.0	

NIGHT OPERATIONS AT WIESBADEN AB.



THOUSANDS OF
HOURS

MONTHLY FLIGHT TIME



TOTAL	1896	28298	35249	43087	36800	28178	34902	40167	37037	46217	58398	57077	54007	61023	19303	5262
NIGHT	234	6727	8862	15466	16947	11145	17519	19091	15307	17381	20445	18134	16259	19806	5752	2075

FLIGHT PROCEDURES

With the facilities made available to the operating organizations and the supplies provided them at the departure airfields, delivery of the required tonnage to Berlin became primarily an operations task. The acceptance capabilities of the terminal airfields were limiting factors in the expansion of the operations. Determination of the traffic flow, therefore, had to be accurate, and precision flight procedures became tantamount to full utilization of the airfields.

To provide the positive time control required, all flights were flown under instrument flight rules, with two methods used to regulate take-off:

- (1) The block system was employed when airfields were widely separated or when aircraft having different cruising speeds were utilized. This system

established a time block for each base covering all take-offs of similar type aircraft.

- (2) The integrated dispatch was employed when two airfields were in proximity or when aircraft dispatched had the same cruising speed. This system insured the proper interval at the point of merging.

Standard operating procedures were established setting forth airspeeds for climb, cruise, and descent so that there would be a minimum deterioration of flow interval. Blind position reports over designated fixes permitted pilots to adjust their intervals as necessary. To insure that intervals were maintained and that the acceptance capabilities of the Berlin terminals were fully utilized, almost no traffic other than that engaged in the Airlift was permitted in the established flow. In fact, Airlift operations at Rhein/Main became so extensive that all

non-Airlift traffic was excluded except a bare minimum of 10 flights per day, authorized as follows:

CARRIER	No. FLIGHTS
Military Air Transport Service	3
American Overseas Airlines	2
Pan-American Airlines	2
Seaboard and Western or Transocean Airlines . .	1
British European Airways	1
European Air Transport Service	1

Only these flights were permitted daily scheduled use of Rhein/Main; itinerants were prohibited except for high dignitaries on governmental business as specifically authorized.



PRECISION FLIGHT PROCEDURES UNDER INSTRUMENT FLIGHT RULES.



AN EARLY MORNING BLOCK AT FASSBERG AWAITING TAKE-OFF.

CORRIDOR *Flight Pattern*



ROUTES AND TERMINAL PROCEDURES

The canalized nature of this operation, with its terminal bases located in confined areas, created a need for precise routes. These had to be utilized by all aircraft regardless of weather, and the procedures had to be standard. The routes and procedures developed are portrayed in the accompanying diagrams.

ALTITUDES

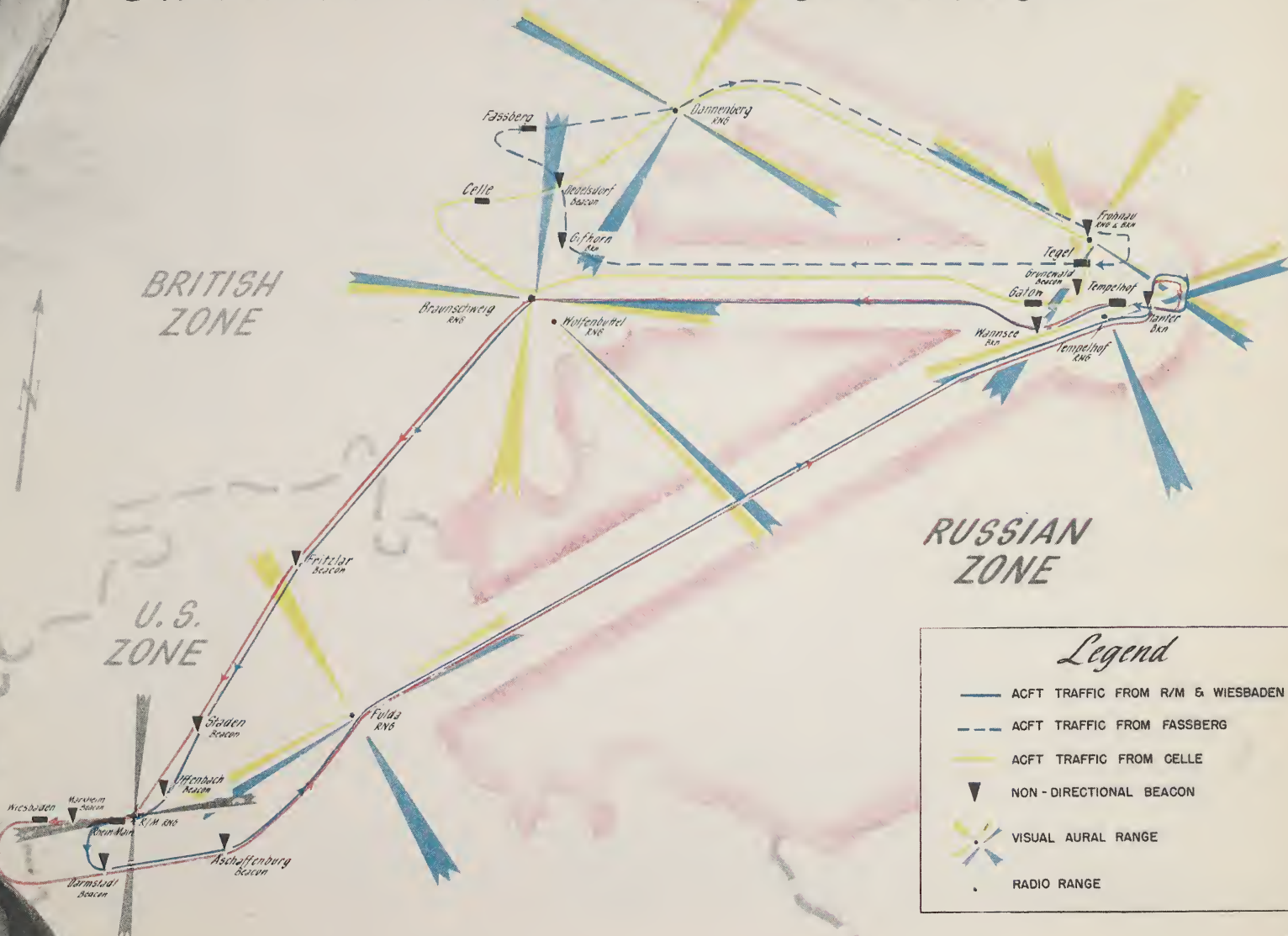
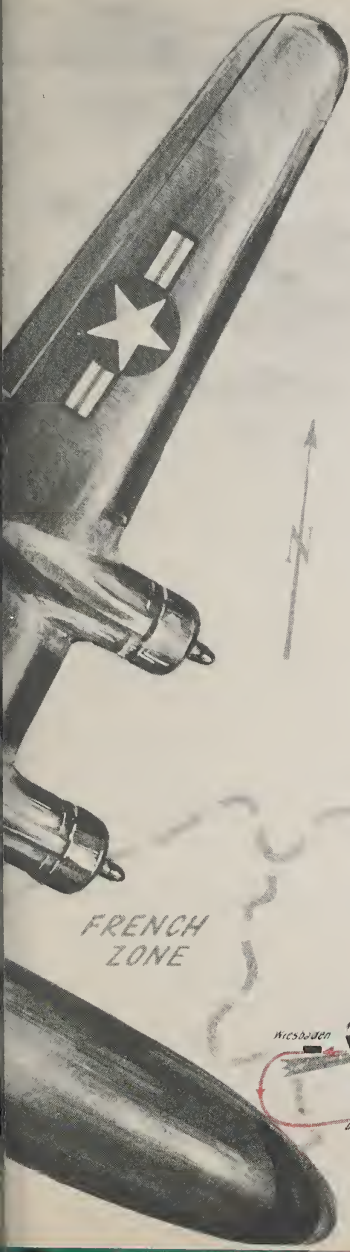
After numerous experiments to determine the minimum adequate separation between successive aircraft of the

same speed en route to the same receiving airfield, it was determined that two altitudes, with a time separation of six minutes between aircraft at the same altitude, afforded the maximum over-all safety for each stream of aircraft from any one base. For short flights of approximately one hour's duration, a 500-foot altitude and three-minute time separation was adequate. Additional altitudes had to be provided whenever aircraft of different cruising speeds were on the same route to the same destination. It was found that the number of altitudes used should be kept to a minimum, in order to expedite flow into the receiving terminal by reducing the time of descent from cruising to approach altitude.

PILOT STANDARDIZATION

To insure that the procedures established were constantly and rigidly adhered to, standardization of pilot performance became an important project. Average USAF pilots, although possessors of instrument certificates, are not consistently as precise in their instrument flying as this operation required. Further, the types of flying previously done by the personnel varied greatly. Therefore, all pilots had to be indoctrinated in the standard procedures employed, and their proficiency had to be maintained at a high level, both in techniques and in adherence to published procedures.

STANDARD PATTERN OF OPERATION



Since there were no surplus aircraft for training purposes, the indoctrination of approximately 1,400 pilots had to be done on-the-job while actually engaged in flying the Airlift. A substantial number of Airlift pilots were trained at the Great Falls Replacement Training Unit in C-54 aircraft along simulated corridor routes. These pilots merely required sufficient indoctrination in the actual Lift procedures and operation. However, continuing checks on them as well as all others were made to maintain a uniform standard of operation.

This standardization was accomplished by the adoption of the Chief Pilot system. A "Standardization Board" was established at Headquarters 1st ALTF. The men chosen for this board were experienced in precision instrument flying. Their duties involved the development and adoption of standard techniques and operating procedures and the indoctrination of aircrews in their use.

The hard core of the system lay in the Chief Pilot and check pilots at group level. These men received instructions and indoctrination from the Crew Qualification Board; thus standardization of performance and instruction was achieved throughout the Airlift Task Force.

In addition to non-standard pilot techniques, there was definite evidence from engine failure analysis and equipment failure analysis that some of the procedures originally in effect were definitely injurious to equipment. Here again the check system proved beneficial. Manuals on equipment use, detailed training regulations, and check procedures were prepared in coordination with the technical representatives of both aircraft and engine manufacturers. Using this material as a guide, additional instructor pilots at squadron level were selected and trained for the purpose of carrying out the required standardization.

The new Airlift crews received under the replacement flow of approximately 17 percent per month had a relatively low average of flying time. This necessitated the upgrading of an average of 8 pilots per squadron per month. However, during certain periods the turnover of crew personnel in a unit was 80 percent in a period of 60 days. Though costly in personnel, this check system accomplished the detailed indoctrination and training of

each individual pilot assigned to duty flights. Discrepancy reports by air traffic controllers, approach controllers, GCA operators, and pilots were constantly studied; and any trends away from established procedures were quickly corrected throughout the command. The most effective control of standardization and efficiency was that established at group level.

The Chief Pilot, the responsible standardization officer in the group, worked closely with operations and was familiar with the many details of the Lift. This put him in an advantageous position to anticipate difficulties, observe performance, and point out any limitations. Through the cooperation of unit commanders, the system assured a consistent standard of performance in flying personnel. Operation on a 24-hour basis posed problems of scheduling crews for such maximum permissible utilization compatible with the limits imposed by health, distance from place of work, availability of transportation, and irregularities caused by weather diversions. It was not feasible to classify pilots as to experience and to schedule them accordingly; therefore, all flight crews had to be standard. Governed by these factors, flying time on this short-haul operation averaged 68 hours per pilot per month.

BRIEFING

Since crew members had to be cognizant of current Airlift rules and procedures at all times, a system of daily briefings was established. Under the "block" system of flying, crews were briefed en masse just prior to going on flight duty, a satisfactory system since there was relatively little waiting between briefing and departure to Berlin. When the block system was discontinued, aircraft were dispatched from various bases to attain an integrated flow. Because of delays between briefing and departure, in many cases the information given at briefing had become obsolete by take-off time. Accordingly, the daily group briefings were eliminated, and thorough weekly briefings on over-all procedures were instituted. In addition, pilots were briefed individually prior to each departure on changes in flight plans, weather, NOTAMS, alternates, and harassing measures to be expected from

the Russians. After the briefing, pilots were given navigation and briefing kits containing current flight information, emergency procedures, maps, and charts. Emergency procedures sometimes required diversions of as much as 400 to 600 miles from normal Airlift routes.

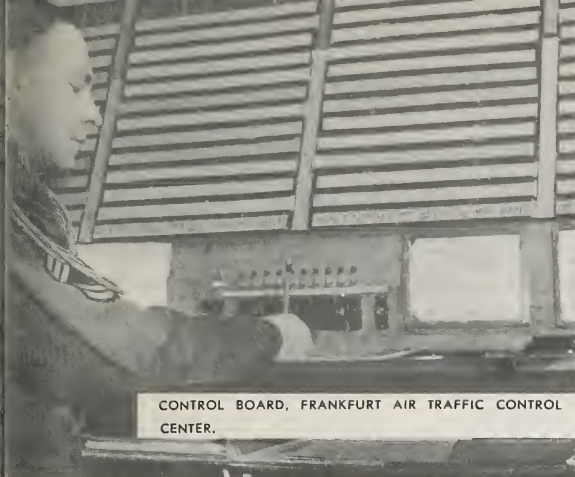
EMERGENCY PROCEDURES

The emergency procedures included in the briefing kit established what to do in the event of communication failures, engine failures, crash landings, or emergency diversions. Normally, an aircraft in distress would turn out of the traffic flow, proceed to an emergency altitude which was kept free, and return to its base or divert to an alternate, depending on the emergency and the weather. In the event of a communications failure which would preclude the aircraft's remaining under the precise air traffic control required, the aircraft would leave the stream of traffic and proceed to a clear weather air base, either its home base or a designated alternate. Aircraft with engine failure which did not justify the jettisoning of cargo could proceed to Gatow or Tegel Air Bases for unloading. If the trouble could not be rectified in Berlin, a take-off on three engines was permitted if the pilot had been designated as qualified for such take-offs.

So that those Airlift bases which had one runway would not have their traffic flow interrupted due to a crash landing, another base within the U.S. occupied zone not directly engaged in the Airlift was designated as the crash landing base to which all aircraft with landing gear trouble or other evidence of possible crash landing would proceed.

Weather diversions were avoided if at all possible by suspension of operations when forecasts indicated the approach of weather below Airlift minimums. If possible, any necessary diversions were effected to other Airlift bases. Certain other airfields within Europe, some as far as 600 miles from the Airlift home base, were designated as weather alternates.

On those rare occasions when diversions were necessary, they were directed by Airlift operations officers on duty in the Air Traffic Control centers.



CONTROL BOARD, FRANKFURT AIR TRAFFIC CONTROL CENTER.

FLOW CONTROL

In order to effect the flow control mentioned above and expedite and regulate all air traffic in the corridors, operational control of the Air Traffic Control centers which had jurisdiction over the Airlift routes and terminal areas was delegated to the Airlift commander. He, in turn, placed his representatives in the towers and Air Traffic Control centers concerned to insure that Airlift policies were carried out. Air Traffic Control directly supervised the rate of flow, the number of landings, the traffic patterns, and the procedures of Airlift and itinerant aircraft entering and leaving the control area. A central control was established within the Airlift staff with the responsibility of continually monitoring the flow of traffic through the corridors, issuing necessary instructions to the Air Traffic Control centers for diversions, and making decisions on controversial issues involving the dispatch and landing of itinerant aircraft. For informational purposes this central office maintained an up-to-the-minute record of tonnage flown.

The authority delegated to Airlift Task Force for the control of air traffic in the corridors and terminal areas was necessary in the early phases of the operation in order to expedite the establishment of procedures required to accomplish this mission most effectively. This authority included prompt departures from International Civil

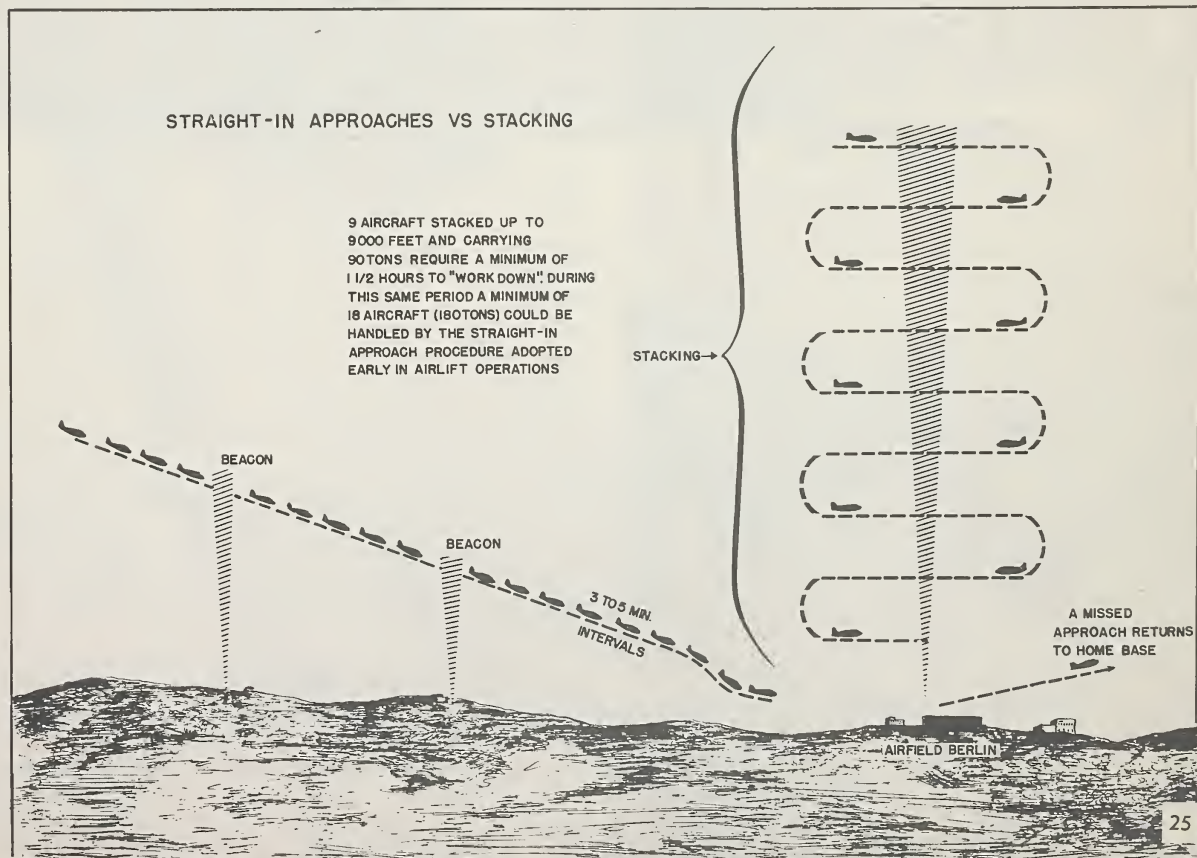
Aviation Organization procedures and Air Force standards whenever necessary. However, the division of responsibilities in Air Traffic Control centers and control towers was difficult to define, and there was considerable overlap of authority and responsibility which on occasion resulted in confusion, delay, and possible hazardous operations. These were due largely to the inexperience of the Airlift representatives in matters pertaining to Air Traffic Control because they were not trained air traffic controllers but were, for the most part, operations officers.

All Air Traffic Control clearances were expedited and voice transmissions were held to a minimum. The detailed routes and procedures were defined and described in a

booklet for pilots which eliminated additional instructions except in emergencies. After early operations indicated the tonnage loss by stacking and holding, positive aircraft flow was established, and aircraft which had missed approaches at Berlin returned to home bases.

PLANNED DIVERSIONS

Planned diversions were attempted in an effort to continue operations when weather at home bases was below Airlift minima. When aircraft were diverted, operational control of aircraft and crews had to be as-





FRANKFURT FLIGHT SERVICE CENTER.



BRIEFING WAS AN IMPORTANT PRE-FLIGHT FUNCTION.



sumed by the diversion base, which often experienced difficulty in the integration of diverted aircraft into its established system of crew scheduling and aircraft maintenance.

Long-range weather forecasts for this area were not sufficiently reliable to justify moving large numbers of personnel and equipment to another station for extended operations. Emergency diversions were attempted only to those terminals located in the area receiving Lift support. The number of aircraft diverted and the length of diversion were determined by the availability of supplies and maintenance facilities at the diversion base.

WEIGHT AND BALANCE

In order to expedite Airlift clearances, a simplified weight and balance clearance was required. This was accomplished by transcribing aircraft weight and balance data to a loading chart installed in each aircraft. This chart indicated a maximum allowable load for the various compartments and served as a guide for both loading and flying crews. Copies of the chart were on file at unit operations, unit loading, and weight and balance offices. Changes in weight and balance data were immediately reflected on the loading chart. This action insured current and accurate information for proper loading of each aircraft. Precomputation of weight and balance data on the aircraft loading charts eliminated the necessity for individual weight and balance clearances and thereby minimized the loading and ground time of the aircraft.

OPERATIONS SUMMARY

Transport aircraft should be stripped of equipment excess to the needs of the operation so that their full payload may be utilized and maintenance problems reduced.

Aircraft types may differ greatly from those used in this operation. It was proved that the C-54 with its 10-ton load operated more efficiently, economically, and effectively than the C-47 with its two and one-half tons. The C-74 operated very efficiently over the Transatlantic

route with Airlift supplies, and the YC-97 was used experimentally for a short period in the Airlift. These large aircraft with greater payloads, faster cruising speeds, and greater cargo compartment capacity will pose actual operational problems not too different from those solved in this operation.

The restricted flight paths available to aircraft in this operation necessitated the use of a single stream for all traffic. However, in future operations where this limitation may or may not be present, other means for navigation such as zero reading or distance measuring equipment with omni-directional ranges, Loran or Shoran, and other future developments in air navigation may effect precision flow control along specified routes.

Operations personnel in transport units must be in a continuous state of training to maintain maximum proficiency so that precision techniques may be employed without further specialized training.

Air Traffic Control agencies should have at their disposal the latest accepted control techniques so that their proficiency in employing such techniques will remain at a high standard. The attainment of this high standard will permit the control agency to be called upon at any time to provide Air Traffic Control service in accordance with any desired procedures, without change in its operational control or its normal mission. However, it is recommended that the using agency accomplish effective liaison with the central traffic control agency in order to pass to aircraft concerned specific operational directives which have definite bearing on the successful completion of the operation.

An important principle which the Airlift clearly illustrated was that positive flow control of traffic must be maintained between the loading areas and the airhead bases, with the maximum acceptance rate at the airhead bases as the determining factor. Since each operation may differ in its detailed air traffic or flow control problems, this chapter has not stressed such details as exact turning points and altitudes. These are problems which must be met through flexibility of operational planning based on the Lift requirements, type of aircraft, terrain features, and distances involved.

TRAFFIC



INTRODUCTION

With the rapidly increasing speed and capacity of modern cargo aircraft and the tremendous importance of the time element in modern logistics, efficient traffic management in the air transportation of cargo is an absolute necessity. Future operations may not be accurately envisaged, but the Berlin Airlift experience and the principles it demonstrated should improve any future mass air cargo movement and assist in its planning.

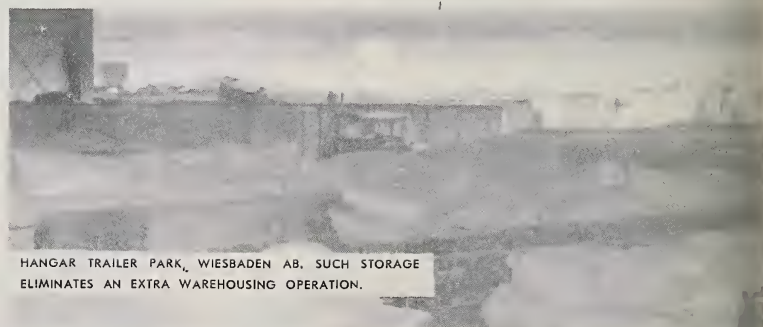
The apparent lasting requirement for airlift to Berlin and its development as a sustained operation necessitated the creation of a Traffic Section on the staff of Airlift Task Force so that air cargo handling would be efficiently accomplished. It was this section which obtained the estimated sortie rate for the following month from other agencies within the headquarters so that advance monthly tonnage capabilities could be given to the Air Staff Com-

mittee in Berlin for allocation according to the needs of the city. The committee would then establish priorities and designate the type commodity to be airlifted when the estimated daily average was exceeded. These priorities afforded the Berlin Airlift Committee (BEALCOM) in Frankfurt with the information necessary to establish the priority of movement of cargo to be handled at each airfield.

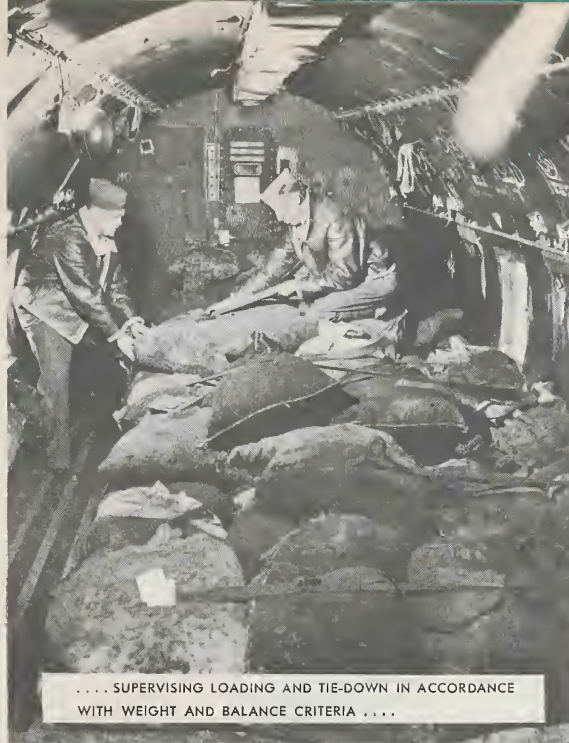
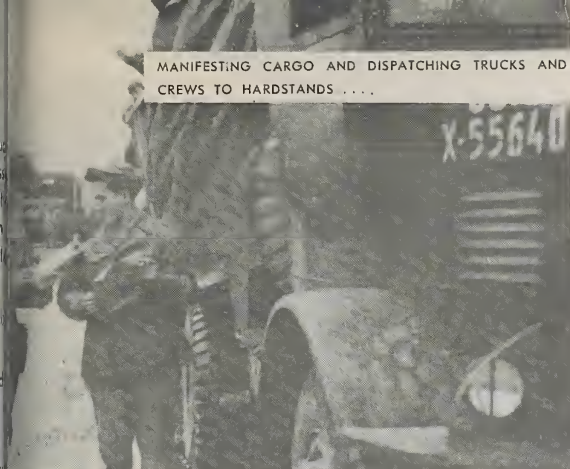
Upon delivery to an airfield of the commodities prescribed by the Air Staff Committee, prompt handling was demanded so that transportation facilities would not be delayed, cargo back-logged, or perishable items spoiled. This need for expeditious handling warranted the assignment of a traffic section to each unit and the development of the Airlift Support Command, which was comprised of Army Transportation Corps units working directly with Airlift personnel. The responsibilities of these organizations were as follows:

Airlift Support Command.

- (1) Unloading trains at railhead into trailers. This included the marrying of high and low density cargo to assure a manageable 10-ton load aboard every C-54 type aircraft, and the weighing and documentation of trailer contents so that accurate aircraft manifests could be prepared.
- (2) Transporting cargo to airfield trailer parks, for subsequent pick-up by line tractors.
- (3) Selection of loads to be standing by, with loading crews aboard the trailers on the ready line for immediate dispatch to aircraft.
- (4) Loading of cargo aboard aircraft in accordance with instructions of Air Force traffic representative.
- (5) Off-loading and holding of outlifted cargo for disposition by BICO licensed agencies.



MANIFESTING CARGO AND DISPATCHING TRUCKS AND CREWS TO HARDSTANDS . . .



... AND COMPILING TRAFFIC STATISTICS.

Airlift Task Force Traffic.

- (1) Manifesting of cargo aboard aircraft.
- (2) Dispatching of trucks and loading crews to correct hardstands and specific aircraft.
- (3) Supervision of loading in accordance with weight and balance criteria to include proper tie-down.
- (4) Compilation of traffic statistics on commodities and tonnage lifted, loading and off-loading times, etc.

As pointed out, the initial requirement of 4,500 tons daily was revised upwards to a minimum comfort requirement of 5,620 tons per day, broken down as shown below:

Cargo	Tons
For the German Populace	
Food	1,435
Coal	3,084
Commerce & Industrial Supplies	255
Newsprint	35
Liquid Fuel	16
Medical Supplies	2
Sub-total	4,827
For U. S., British & French Military	763
Three Passenger Flights (U. S. and French) .	30
Total Combined	5,620

However, when the maximum tonnage within the capabilities of the Airlift was requested, this minimum was exceeded daily from January on. All in excess of the city's requirements was for stockpiling.

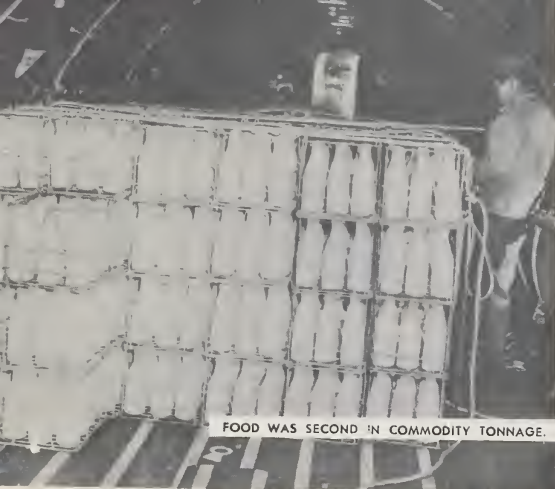
COMMODITIES AIRLIFTED

Many types of commodities were airlifted to and from Berlin, but coal constituted approximately 2/3 of all tonnage lifted. Approximately 20 percent was food products, and the remainder included liquid fuel, raw materials, industrial supplies, construction equipment, mail, medical supplies, newsprint, manufacturer's goods, delicate instruments, heavy machinery, empty coal and flour sacks, vehicles, and household effects. This variety of commodities presented special handling and loading difficulties because of variances in weight, shape, size, density, or physical

properties. To reduce these difficulties as much as possible, special type cargo was handled from only two airfields, Wiesbaden being the U. S. field used because of its flight of C-82's and specialized equipment. A few difficulties in handling certain types of cargo are highlighted below:

Coal. At first it appeared relatively easy to handle coal as it was compactly sacked and could be roughly handled both in loading and unloading. However, it was discovered that a sharp and abrasive dust would sift out from the sacks and seep into the inner fuselage, wings, and engines. This dust had a harmful effect on the aircraft surfaces with which it came in contact, and consequently the coal-carrying aircraft as a group presented the most difficult problems during inspections and maintenance, especially in their cleaning. Dust control was attempted by laying a tarpaulin on the floor of the aircraft, by dampening the cloth sacks, or by doubling the paper sacks with tied ends opposite; but the dust still persisted, although in smaller amounts when the paper sacks were used. Thorough sweeping after each loading further reduced the problem. At the end, tests were being conducted at Burtonwood to develop a sealing compound to be sprayed on the floor to prevent dust seepage into the fuselage.

Considerable dead weight was carried when canvas or jute sacks were used, especially as they became older



FOOD WAS SECOND IN COMMODITY TONNAGE.

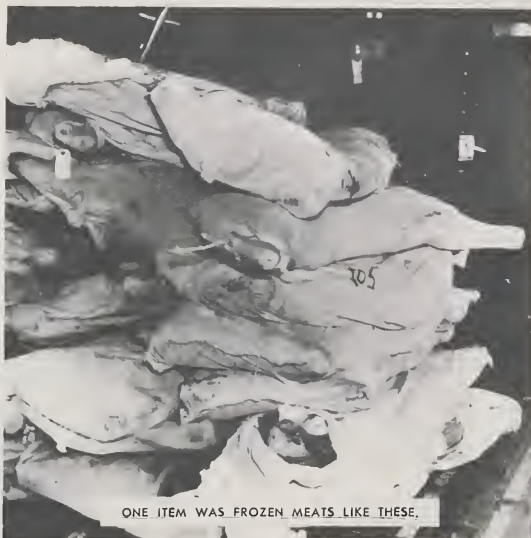
in use and heavier with dust. The development of the paper sack and its use assisted in providing more coal per load and reduced the dust as mentioned above. The paper sacks were durable through three to five trips, and their cost was not prohibitive when balanced against the additional actual payload in coal resulting from their use.

Food. Food was second in commodity tonnage hauled to Berlin. Types included were sacked grains, vegetables, frozen meats, fish, dairy products, and fresh fruits. Dehydration was accomplished on all food items which could be processed in that manner to obtain the maximum calorie value per food ton. No spoilage loss was incurred in frozen foods because of the rapid handling they received.

The major food-handling problem was that caused by the corrosive effect of salt on aircraft control cables when the salt would seep through the aircraft floors. This was resolved by the use of British flying boats with overhead cables treated against corrosion, and later through the use of converted RAF bombers by storing the salt in cargo boxes in the bomb bay and by outside cargo "panniers" attached to the fuselage of British Haltons. Security measures were continually necessary in the handling of food to prevent pilfering, as its actual value

was much greater than the newly established currency, and it could be readily disposed of.

POL. The initial method for transporting POL products—in 55-gallon metal drums—proved very unsatisfactory because of the material tonnage lost in the drum's weight and



ONE ITEM WAS FROZEN MEATS LIKE THESE.



THE C-54'S CARRIED BULKY CARGO AND VEHICLES.



EVEN LARGE ITEMS OF BERLIN INDUSTRIAL EQUIPMENT WERE AIRLIFTED.

the necessity for steam-cleaning the empty containers and outfitting them from Berlin. Then the British contracted for the services of a fleet of commercial tanker aircraft capable of delivering 550 tons a day of liquid fuel. Since the tanker method of fuel transport proved by far the most efficient, the airlift of all liquid fuels was assigned to this fleet. British bases were used, with approximately half of the total fuel airlifted originating at Wunstorf, where a unique loading system was installed. This consisted of rail sidings which permitted tank cars to deliver directly to underground storage pools from which the various fuels were pumped to 12 distributing points at aircraft parking positions. To load an aircraft, the desired quantity was selected on the regulator dial, and the electric pumps provided a flow of 100 gallons per minute and stopped automatically when the pre-set gallonage was delivered. The tankers flew into Gatow and Tegel, where pipes to underground storage tanks enabled unloading by gravity flow directly from the aircraft at a rate of eight and one-half tons in 18 minutes.

Industrial Supplies. Certain essential industries for the preservation of life or the economic recovery of Berlin needed raw materials and supplies to remain partially active. Keeping these industries active eliminated extensive

unemployment and demoralization. However, the greatly varying types of materials presented new problems because of sizes, weights, shapes, or special handling requirements. These had to be solved on the spot. As mentioned above, however, an initial planning step, designed to centralize the problem, established Wiesbaden as the base to handle miscellaneous type cargo.

Engineering and Construction Material. The demand for improvements at existing airfields in the Western sectors of Berlin and the need for construction of another necessitated the airlift of much heavy construction equipment and material. Some pieces of equipment had to be cut into sections for the trip and welded together in Berlin. C-82 aircraft were used to great advantage in the transportation of unusual shape construction cargo. Asphalt in 400-pound drums was transported in sufficient quantities to provide paving material for the new base and runways. To control damage from leakage of this material, tarpaulins were used over and under the cargo. Tiedown ropes had to be replaced frequently, as

they became slick and would not hold the cargo.

Miscellaneous Supplies. Of the many types of miscellaneous cargo, medical supplies received most urgent handling. One item which required special handling due to its extreme volatility was ether. It had to be packed in very small containers and treated as fragile to prevent escape of fumes. Six-hundred-pound rolls of newsprint loaded by fork-lifts and unloaded by chutes were transported regularly.

PRODUCTION CONTROL

Sustained Airlift operational complexities dictated the need for a new staff section to expedite all ground activities. On the assumption that an aircraft on the ground was not contributing to the Airlift effort, emphasis was placed on minimizing the ground time of all aircraft in the operation. To direct this function, a production control unit was organized. A 24-hour operation, the new activity utilized a central control room equipped with direct tele-

phone and intercom lines to all ground-handling agencies, Air Traffic Control, and Task Force Headquarters Operations. The production control duty officer was given complete authority to monitor and expedite the functions of all activities concerned with turn-around of aircraft — i. e., loading, unloading, maintenance, and crew and aircraft dispatch.

To preclude possible ground delays in the handling of incoming aircraft, an aircraft status call-in procedure was established. This air-to-ground notification of mechanical and load status enabled the controller to alert sections concerned prior to the aircraft's arrival. To provide a constant check on the location and status of all aircraft, locator and maintenance status boards were maintained in the central control room. This considerably aided in coordinating crew assignments, loading, and servicing of aircraft, and generally expedited the over-all operation. Ramp expeditors in radio-equipped jeeps were highly effective in eliminating delays by making on-the-spot reports of ramp activities to the controlling officer.

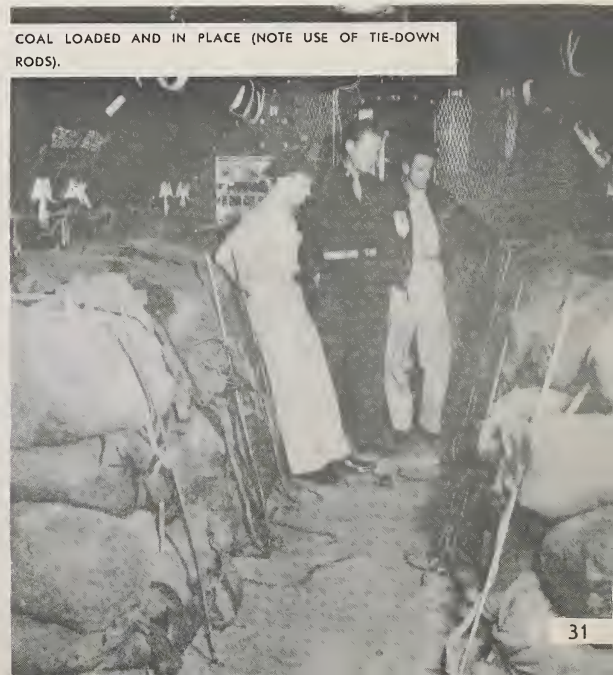
CONSTRUCTION EQUIPMENT AND SUPPLIES FROM DUMP-TRUCKS TO ASPHALT WERE DELIVERED BY AIR.



LOADING A LARGE BOILER.



COAL LOADED AND IN PLACE (NOTE USE OF TIE-DOWN RODS).



MINIMUM TURN-AROUND TIME

By means of a coded VHF message, the pilot of each aircraft returning from Berlin reported, approximately 10 minutes before landing, its hardstand number and whether it was in commission and had a load. A report of "Positive-Positive" indicated an aircraft in commission for which off-loading was required. However, when an aircraft required a load, the trailers were at the hardstand, and the loading was commenced simultaneously with refueling, turn-around maintenance, and placing of tail stands.

Manifesting was accomplished by traffic personnel from the loading lists of the first trailer on the ready-

line. Manifests listed the commodities, their piece count and piece weight, total commodity weight, and total load weight for all commodities. Except where miscellaneous cargo was handled, this process was routinely automatic as to data inserted. The total allowable cabin load was obtained from an aircraft index card file, and the compartment break-down, also pre-computed on the index card, was quickly transcribed in terms of commodity piece count to the manifest. The complete loading diagram by compartment referred to under **Weight and Balance** enabled traffic supervisors to load each aircraft with maximum speed and safety.

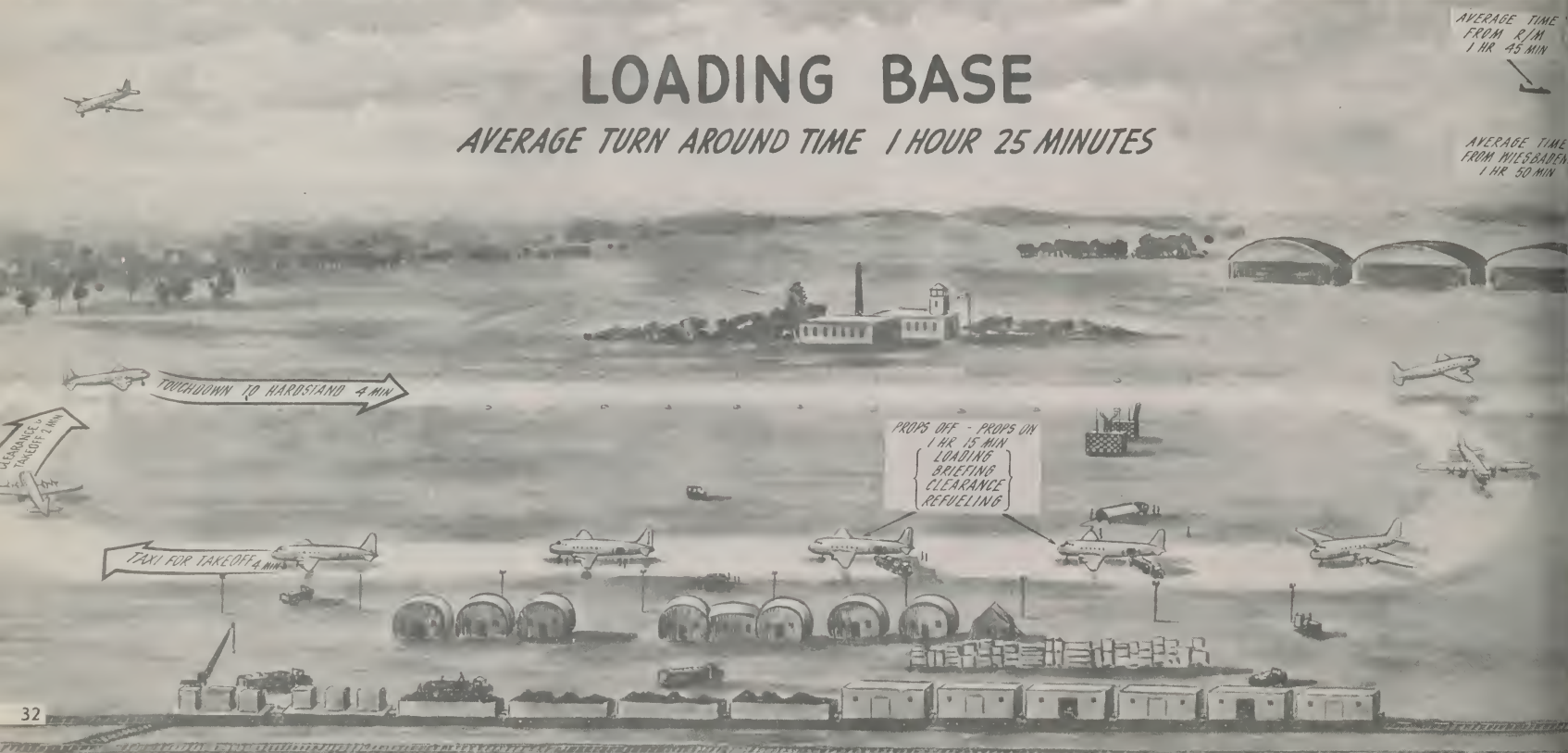
ALLOCATION OF LOAD

Cargo hauling problems were met with the objective of delivering to Berlin the maximum useful tonnage to the airfield best suited to receive it. Consequently, loading for the various bases were determined by the type cargo handled by that base and its Berlin base destination. Routing of supplies was the responsibility of the Berlin Airlift Committee (BEALCOM), which was guided by the following general procedure:

Wiesbaden aircraft landed at Tempelhof.
Rhein/Main aircraft landed at Tempelhof.
Fassberg aircraft landed at Tegel.
Celle aircraft landed at Gatow.

LOADING BASE

AVERAGE TURN AROUND TIME 1 HOUR 25 MINUTES



BERLIN OFF-LOADING

The main features of the off-loading operation at the three airhead bases were:

- (1) Central ramp facilities in which unloading could be concentrated.
- (2) Central dispatch of vehicles to planes.
- (3) Wooden chutes to expedite unloading, except where fork-lifts or cranes were required for irregular items.
- (4) Land piers for transit docks to transfer cargo to German trucks or into rail cars.
- (5) Warehouse or terminal space to store outlift cargo.

(6) Underground storage tanks and pipeline at Gatow and Tegel for direct discharge of liquid fuel from British tanker aircraft.

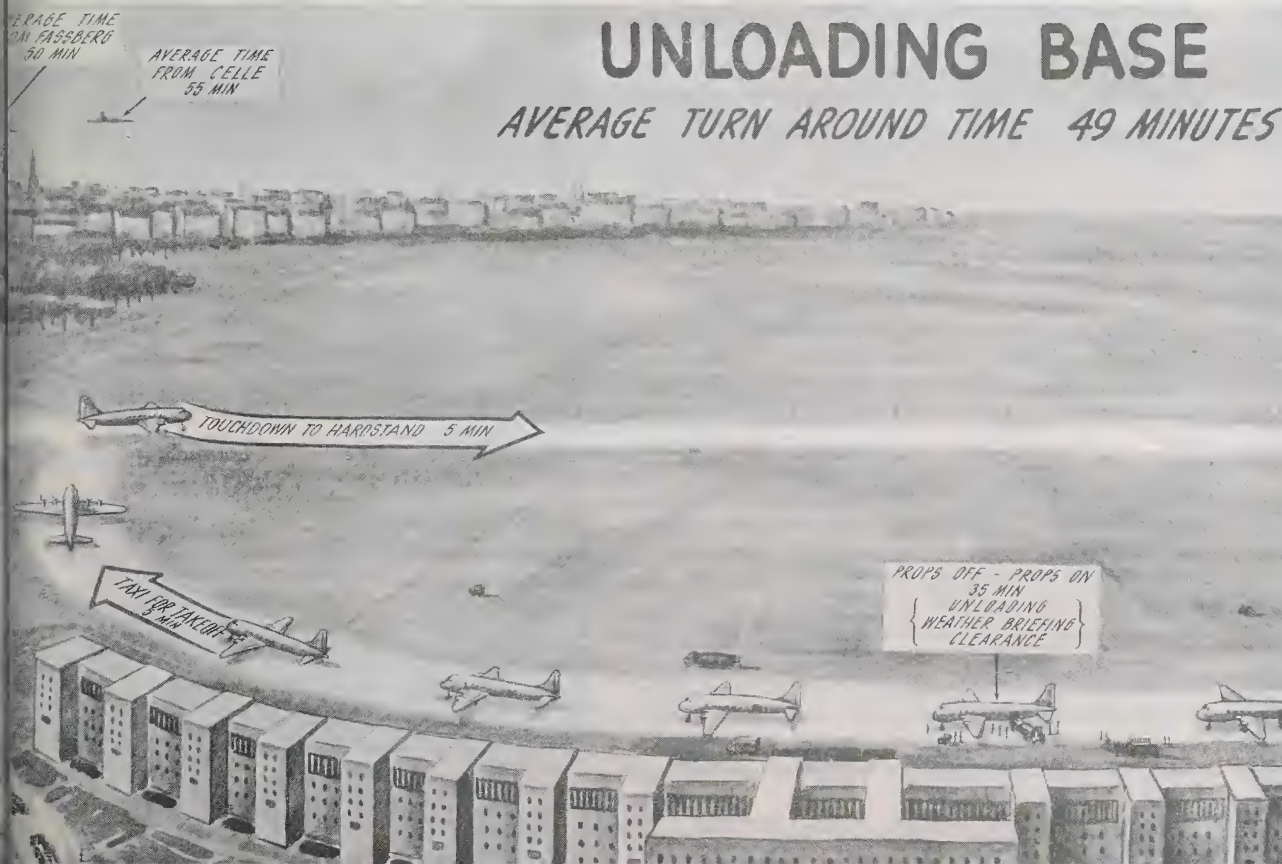
At the Berlin airfields, British, American, and French ground force agencies performed the off-loading and any necessary loading function under Air Force supervision until the airhead personnel were sufficiently trained to meet joint Air Force and Army Transportation Corps requirements.

All of the measures discussed above were designed to restrict to a minimum the ground time of Airlift aircraft. With the existence of the requirement to deliver the maximum tonnage within Airlift capabilities, it was essen-

tial to obtain the maximum productivity from each individual, vehicle, and aircraft engaged in the project. Outlifting of cargo from Berlin, while causing some additional ground time in Berlin, was necessary so that manufactured products, empty coal sacks, vehicles, and possessions of personnel transported from Berlin could be taken to the West.

DIVERSION OF AIRCRAFT

The term "diversion" in traffic movement control terminology traditionally has denoted the change from one means of transport to another, i. e., air-to-surface. How-



ever, in this operation, it took on a new concept in meaning the diverting of the air transport fleet from one loading terminal to another to take advantage of favorable weather conditions.

During three very bad-weather days in January, a planned diversion of Rhein/Main and Wiesbaden aircraft to Fassberg and Celle was conducted. Within the period, 145 trips (carrying approximately 1,450 tons) were made by the diverted aircraft, in addition to the trips flown and tonnage hauled by the aircraft normally based at the diversion fields. However, during the five-day period following the diversion, Rhein/Main operated at a below-average level due to the increased maintenance required on the aircraft operated away from their squadron facilities.

TEMPELHOF WAS A GOOD EXAMPLE OF CENTRAL RAMP FACILITIES AND CENTRAL VEHICLE DISPATCHING.



UTILIZATION OF PAYLOAD

The payload utilization of a cargo aircraft must be maintained in keeping with the dictates of safety in regard to proper weight and balance of the aircraft. Internal space available, the designed stresses for the flooring, and the desired center of gravity of the loaded aircraft all influence the establishment of allowable compartment loads. Although improper loading may have tragic consequences, lost tonnage attributable to underloading is a reprehensible, expensive, and irredeemable loss.

In an effort to increase the payload of the C-54, an experimental weight-stripping program was conducted at Burtonwood Air Depot on the D, E, and G series of this aircraft. The C-54's were weighed prior to the stripping program and were found to average 300 pounds lighter than indicated in the weight and balance data book. The aircraft were then stripped of approximately 2,200 pounds of unessential equipment, thereby increasing the over-all payload 2,500 pounds. Flight tests proved that the aircraft flight characteristics were unchanged by the modification. Maintenance was slightly less complicated due to the reduction of equipment.

LOADING TECHNIQUES AND EQUIPMENT

Accurate Loading. Platform scales were utilized where available, to weigh heavy trailer loads and cargo before they proceeded to the ready-line for dispatch to an aircraft. At the base where these scales were continually used, several overloads were reported by the pilots when the scale was out of operation during a brief period. To assure weight accuracy, additional control was exercised by rechecking the individual package weights at the railheads. At one time 200 freight carloads of coal were returned to the sacking plant for correction after the checking had indicated serious discrepancies. Without these weight adjustments or frequent checking, it was possible that an aircraft could have been overloaded by as much as 6,000 pounds. However, the absence of checking could also result in short loads. On many occasions, the tonnage receipted for in Berlin was less than that manifested at the

loading bases. Discrepancies on coal deliveries were usually caused by moisture loss, leaky or broken sacks, inaccurate checking or inaccurate sacking. When some of these discrepancies are compared, the importance of accurate cargo checking and weighing is positively illustrated. Traffic loading technicians were responsible for correct piece and weight count loaded aboard aircraft at Rhein/Main and Wiesbaden in addition to the proper loading of the cargo and its tie-down. This method was under continuous comparison to that utilized at the northern bases, where a British Ground Force checker accompanied the loading crew and accomplished the checking of the cargo during the loading. The latter system required extra men as a checker was needed with each



OTHER MAIN FEATURES OF THE OFF-LOADING OPERATION INCLUDED WOODEN CHUTES



. . . . AND LAND PIERS FOR TRANSFER OF CARGO TO GERMAN TRUCKS OR RAIL CARS.



THIS FUSELAGE WAS USED IN TEACHING LOADING METHODS.



THE EVANS TIE-DOWN KIT WAS STANDARD EQUIPMENT.



MOBILE CONVEYOR BELT IN USE WITH THE YC-97.

loading crew. However, in view of the discrepancy reports received on loads checked under the former method, the additional manpower required under the latter method may well have been justified.

"Marrying" Loads. In order to utilize fully the 10-ton load capacity of each aircraft, it was necessary to "marry" commodities of high density with those of low density to comply with the aircraft loading requirements. This "marrying" process, a major operation of the Transportation Corps at Airlift base railheads, was best accomplished when personnel responsible for aircraft loading aided in the preparation of the trailer loads. Heavily concentrated cargo was placed at the rear of a truck or trailer so that it could be easily loaded forward in the aircraft fuselage for proper aircraft balance and so that light, bulky cargo could be loaded on top of the heavy pieces to avoid crushing.

At USAF bases 10-ton truck trailer units were employed for the transport of cargo from railheads to aircraft. These vehicles presented the advantages of a large bed area which permitted easier load-marriage and versatility in use as mobile storage for built-up loads. The difficulties

encountered in backing and positioning this equipment, however, prevented its use from being completely satisfactory.

Loading crews were generally standardized into units of 12 German laborers under the supervision of an Air Force loading technician. Cargo weighing less than 250 pounds was ordinarily handled without the use of mechanical aids. Experience proved that the loading and unloading of aircraft could in most cases be accomplished more effectively by utilizing manpower.

Training of Loading Crews. Continued supervision and training of loading crews was essential to expedite all loads and meet changing requirements due to new types of cargo not formerly moved. To train these crews, one of the bases used an old fuselage with a dummy load. This facility provided training in loading, computation of weight and balance data, and tie-down techniques. Hundreds of officers and men were trained in actual operation in aircraft loading methods which provided both speed and full payload utilization.

Cargo Tie-down. The Evans tie-down kit equipment was standard equipment on U. S. aircraft when they

arrived for duty with the Airlift. However, normal attrition rendered much of the available equipment unserviceable early in the operation. There was but a small stock of resupply items on hand for the kit, and its workload was heavy. While the attrition rate was not excessive, replacement of worn parts involved considerable expense.

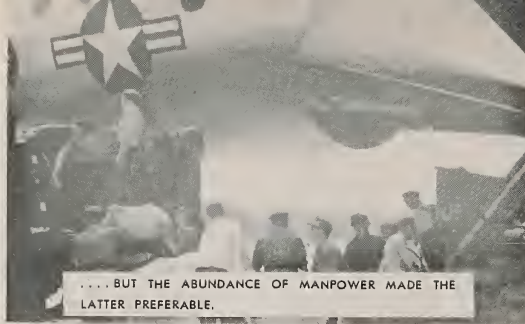
Traffic units carried on continuous research to develop new tie-down methods and equipment which would be both effective and lasting for heavy equipment. As supplies of the standard equipment dwindled, a web strap tie-down was investigated. Preliminary tests of the web strap were encouraging, and a supply was ordered. However, certain modifications were necessary on the buckle assemblies before this equipment was considered versatile enough for regular use.

For securing high density cargo such as construction machinery, a steel cable tie-down was used with satisfactory results. However, because of its lack of elasticity, this type could not be utilized with cargo which tended to settle or pack as a result of vibration in flight.

Cargo Handling. Heavy industrial and construction materials called for the use of mechanical loading aids.



LOADING BY FORK-LIFT WAS OFTEN USED . .



.... BUT THE ABUNDANCE OF MANPOWER MADE THE LATTER PREFERABLE.



BRITISH FLIGHTS CARRIED THOUSANDS OF PASSENGERS OUT OF BERLIN



... MANY OF THEM UNDERNOURISHED

Pallet loading with fork-lifts was found unsatisfactory because unfavorable ground conditions often restricted maneuverability. High-lift truck loading proved slow, because the limited capacity of these vehicles necessitated the positioning of more than one truck to an aircraft. Both of the systems mentioned increased the possibility of damage to aircraft by loading equipment.

Platform loading entailed a definite loss of time for platform and plane positioning. An experimental mobile conveyor belt was employed during the service testing of the YC-97. This system has proved to have definite advantages over other methods in loading large-type transports.

The nature of the cargo handled, the types of aircraft utilized, and the availability of labor dictated the equipment and techniques employed in loading and unloading. On this project, abundance of labor prescribed its use in preference to mechanical aids. This principle would be true in all cases in which the cargo is of a type which can be readily manhandled and the load capabilities of the aircraft used do not exceed 10 tons. Where adequate manpower is not available, systems employing equipment such as forklifts, high-lift trucks, roller conveyors, and conveyor belts must be utilized. In the service testing of larger type aircraft, it was definitely established that the maximum utilization of mechanical aids for such craft is mandatory.

Safety measures introduced on the Airlift resulted in a minimum amount of damage to aircraft and vehicles.

Loading trucks which could handle sufficient cargo to load an aircraft in one trip were utilized to reduce the number of vehicle-to-aircraft approaches. Wheel blocks were used to insure that a safe distance was maintained between trucks and aircraft. Lighting for night loading was augmented by the installation of additional floodlights on ramps and spotlights on vehicles and fork-lifts.

PASSENGERS

The blockade not only applied to supplies going to and from Berlin, but also restricted the ground movement of personnel. Many Western zone residents were trapped in Berlin at the beginning of the blockade. In addition, British, French, and U.S. personnel frequently had official need for transportation between Berlin and the Western zones. Therefore, provisions had to be made for

removing from or transporting to Berlin personnel whose travel was absolutely necessary.

The first personnel which were moved en masse from Berlin were those who required medical treatment which was not available in Berlin; they included pre-tuberculosis and early tuberculosis cases, persons medically certified as needing long periods of rest and good food, and delicate or undernourished children. In all, the Royal Air Force transported 130,000 people out of Berlin during the Lift. Regularly scheduled passenger flights operated from Rhein/Main for the transportation of administrative personnel between the U. S. zone and Berlin. From the start of these flights 16 August 1948 to the termination of the operation, more than 44,000 persons were carried by the U. S. into and out of Berlin. Another daily passenger flight from Wiesbaden provided exclusively for the French, transported 19,000 French personnel to and from the city.



AIR TRANSPORT AIRCRAFT - MONEY LOSERS WHEN NOT DELIVERING CARGO.

CONCLUSIONS

Traffic. In traffic as well as other aspects of an operation of this nature, an inherent danger lurks in the drawing of specific conclusions from the Berlin Airlift for direct application to another mass air cargo movement, because of factors which may differ completely from those existing during this operation. Any principles developed in this operation must be weighed as to their degree of applicability to any type of operation. Many solutions of problems are conditioned by existing circumstances, and such problems must be solved by studying them both in their environment and out of it. The character of an airlift operation may be changed to a significant degree by the alteration of one or two of the factors upon which it depends — weather, length of the haul, availability of manpower, and the type of aircraft employed. Such

alterations may pose new problems and require new solutions.

Traffic functions include the recognition of the importance of cargo control and liaison requirements between all agencies involved in the handling of cargo, the training of traffic technicians, and the development of support facilities to expedite the movement of cargo. The fusing of troop carrier and transport squadrons into the Airlift Task Force underscored the importance of the traffic management and its many ramifications. The need for traffic administrators and technicians within the organization of the airlifting agency, as well as within supply and ground transport organizations and all coordinating and control boards, for the allocation, scheduling, control, handling, loading, tie-down, unloading, and distribution of Airlift supplies has given greater recognition to traffic responsibilities. Personnel to execute these



EFFICIENCY IN GROUND OPERATIONS IS A MAJOR STEP TOWARD MAXIMUM AIRCRAFT UTILIZATION.

traffic functions must be selected and trained rather than merely assigned and utilized. Qualified personnel should be selected rather than those who cannot fulfill other tasks satisfactorily. Officers and men who are skilled in administration, supply, transportation, and cargo handling, and who possess aggressive, conscientious, and imaginative mentalities, can insure satisfaction in the movement of cargo for the shipper, the mover, and the receiver.

An air transport aircraft is a money loser when not delivering cargo. It is economically wise to utilize fully the capabilities of the transport fleet. Standardization and streamlining of procedures, preplanning of loads, and the reduction of ground times and maintenance outages increase the economic worth of each aircraft assigned to an operation.

Full payload utilization by weight, cube and optimum product value per ton must be ever present in the transport operation. Measures to achieve this include stripping excess gear from the aircraft to increase its payload, increasing the air transportability by dehydration of foodstuffs, reducing container weight, and "marrying" high and low density cargo into a load which utilizes both space and weight capacities of the aircraft.

Operational performance alone is not a full measure of the success or failure of an air transport operation. Such an operation may indicate complete success when measured in terms of aircraft utilization, ground times, surpassing of arbitrary goals, and prompt departures of scheduled flights. However, behind these may be hidden

economic wastages of personnel and inefficient ground handling methods which do not produce full satisfaction to the shipper and the receiver.

Priorities as established must be met, and priority cargo must be moved on schedule. This is a responsibility of support agencies, for the air carrier merely moves what is delivered when it is delivered. To assure cargo being at the right spot at the right time and in the right quantity, extensive liaison must be fulfilled between **all** the agencies involved in the operation. In this operation, the creation of the Berlin Air Staff Committee, the Berlin Airlift Committee, and the Airlift Support Command evidenced the need for this close liaison and such liaison proved of inestimable value. Air transport is an extremely flexible and effective logistics tool. The speed with which carrier operations can shift requires slower moving ground agencies to be geared for rapid changes. Thus, ground liaison personnel must be included in the planning and informed of all operational orders and new requirements as soon as they exist.

Ground Control. The major requirements of successful traffic movement control, as highlighted in the Berlin Airlift are listed below and should be vested in a central agency.

- (1) Central control of all cargo traffic in an area.
- (2) Accurate, complete, and timely information of movements and backlogs in the immediate area and in those areas which directly affect, or are directly affected by, the control of traffic in the immediate area.
- (3) Authority to route, re-route, divert, delay, or expedite all traffic in the area.
- (4) Up-to-date information regarding pipe-line flow, and authority over the flow commensurate with defined responsibilities.
- (5) Dependable information and first-hand knowledge of traffic and supply conditions at destinations served by transportation agencies from the supplying area. It is imperative that traffic and transport **officials** maintain close, constant touch with actual field conditions.

- (6) Complete information concerning schedules, specific types of aircraft used on each flight, route connections, transit facilities, maintenance and operational conditions, and local transport and supply services.
- (7) Flexibility and speed of action.
- (8) Aggressive and imaginative personnel experience in supply and all types of transportation.

Support Facilities. Inefficient ground operation may adversely affect the conduct and economies of a major airlift operation. Therefore, ground support facilities such as transportation and warehouse installations and central loading ramps should be planned and constructed early in the operation so that the job can be performed economically and efficiently. Although the duration of an operation has direct bearing on expenditures for construction, these factors must be weighed in each individual case. Construction costs, while seemingly high, become infinitesimally small when compared directly to the cost of inefficient air transport and air base operations.



INTEGRATED GROUND CONTROL IS ONE OF THE KEYS TO SUCCESSFUL CARGO MOVEMENT.

COMMUNICATIONS



INTRODUCTION

Prior to the Airlift, in keeping with USAF policy, a general reduction in force was being effected within USAFE. This reduction in force resulted in serious shortages of communications personnel.

From a communications and navigational aids standpoint, facilities between Berlin and Western Germany were limited to the barest necessities before the Airlift. There was only one GCA set in the Berlin area and only one radar aid for corridor control; GCA sets were also located at each of the air fields at Rhein/Main and Wiesbaden. Navigational aid facilities consisted of radio ranges installed at Rhein/Main, Fulda, Frankfurt, and Tempelhof. Radio beacons were installed at Offenbach, Tempelhof, and Wiesbaden. All navigational aids had been removed from the corridors leading to Berlin. These facilities, of course, were wholly inadequate for handling heavy traffic during instrument-weather conditions.

With the implementation of the Airlift on 26 June 1948 it was immediately apparent that the proposed intensity of traffic would require additional electronic aids of all types, expansion of wire and radio communications facilities, and more rigid air traffic control. Analysis of the problem confronting communications personnel revealed unusual requirements for Airlift operation that made a difficult task much more difficult. Berlin tonnage requirements were such as to necessitate a constant flow of aircraft predicated on three-minute intervals of no "stacking" or "missed approaches". The geographical location of Berlin, well within Russian-controlled territory, precluded the installation of route navigational aids to serve as check points and contain the Aircraft within the twenty-mile-wide corridors. Certain restrictions were placed on altitudes to be flown because of agreements with the Russian authorities, terrain features, and operational problems. Approach and let-down patterns in the Berlin area intersected in a vertical plane because of the small area into which certain patterns had to be fitted. This condition, of course, meant that rigid air traffic control, both laterally and vertically, had to be maintained on a split-second time schedule. An idea of traffic density can best be derived

by the feat of the Airlift "Easter Parade," when on Easter Sunday of 1949, approximately 13,000 tons of cargo were airlifted into Berlin. This meant approximately 1,400 aircraft arrivals and approximately 1,400 departures within 24 hours, using three fields within a radius of twenty miles. The attendant problems and solutions of the various communications phases of this operation are presented under the specialized subjects which follow.

PERSONNEL

The low degree of proficiency of technical personnel was a handicap in the Airlift operation. In August 1949 a study was made to determine the degree of proficiency of personnel in each communications specialty. The information was derived from the consensus of opinion of supervisory personnel at each Airlift base. Where practicable, the amount of additional training required to meet the desired standards was established. This study indicated that the average degree of proficiency for all communications specialties was 70 percent.

Due to the nature of the Airlift mission, very little training could be accomplished other than on-the-job. It was absolutely necessary that every person in an already under-staffed specialty be utilized to the utmost even though greater supervision was required, thereby reducing over-all efficiency per capita. It was mandatory that airborne radio operators (SSN 2756) be familiar with ICAO procedures in order to comply with regulations governing international flights. To meet these qualifications it was necessary for each unit to emphasize this type of training to the utmost. Although radio operators were not a normal requirement for Airlift planes flying to Berlin, they were required for flights to Burtonwood and the ZI.

Many of the individuals in radio mechanic specialties (SSN's 754, 648, etc.) had been permitted to specialize in specific types of equipment during previous assignments and were not adequately trained in all types of equipment employed in this operation. This lack of versatility was a definite handicap. Units were in a position of having an overage of personnel that was familiar with specific types of equipment, yet untrained in the types required

by the Airlift.

On-the-job training was accomplished to a degree in all the skills employed. It was, however, impossible to place much emphasis on any project of this type due to employment of personnel on a 24-hour basis and to the pressure of operating with a shortage of electronic technicians. The total requirement for communication personnel in the support of Operation Vittles was 590 officers and 6,156 airmen.

FIXED WIRE COMMUNICATIONS

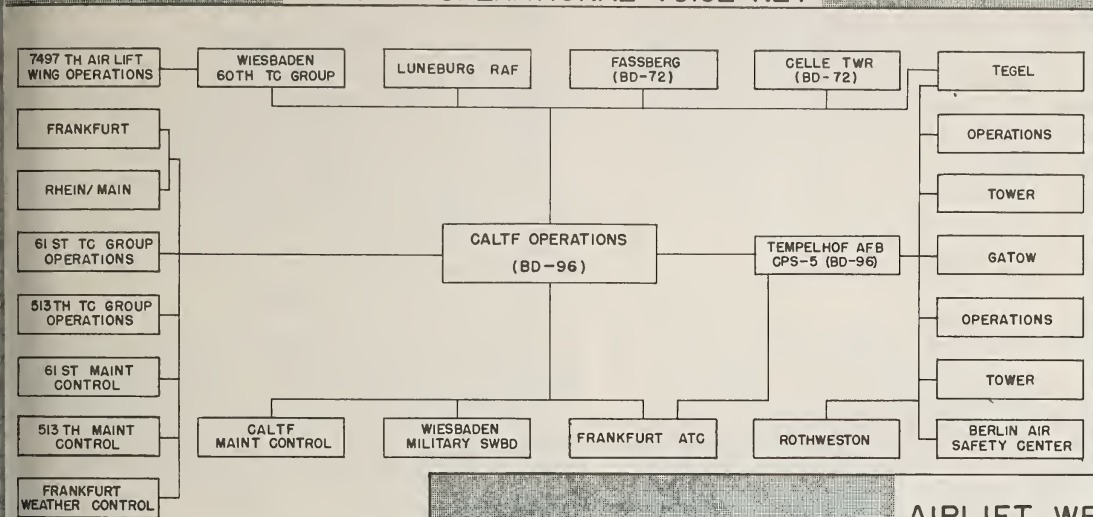
At the very beginning of the operation, it was quite evident that a rapid and reliable method of voice communication between Airlift Headquarters and the field organizations was a necessity. Fortunately, wire communication was available and was preferred over radio because of its greater reliability and the non-susceptibility to ionospherics.

Direct "hot" land-line voice circuits were installed from Airlift Headquarters to the operations offices at the various bases and air traffic-control centers. One BD-96 switchboard was installed at Airlift Headquarters for the control of these lines and for "patching through" so that bases could be interconnected. Likewise, direct lines were installed between control towers within an area and between the control centers and the bases. These circuits were required for constant supervision, for the establishment of intervals, and to direct diversions. Since the system of operation was predicated on an uninterrupted flow of traffic 24 hours a day, it was necessary to be informed on all aircraft activity. On "missed approaches" in the Berlin area, aircraft were directed to return to their home bases. Any attempt to land these aircraft would have required "stacking", thereby causing confusion and delaying operations in order to cope with the 40 aircraft already in the corridor. Diversion of aircraft demanded instant communications since the operation was conducted on bare minima of ceiling and visibility (200 feet and one-half mile at most bases). It was, therefore, constantly necessary to watch all weather reports.

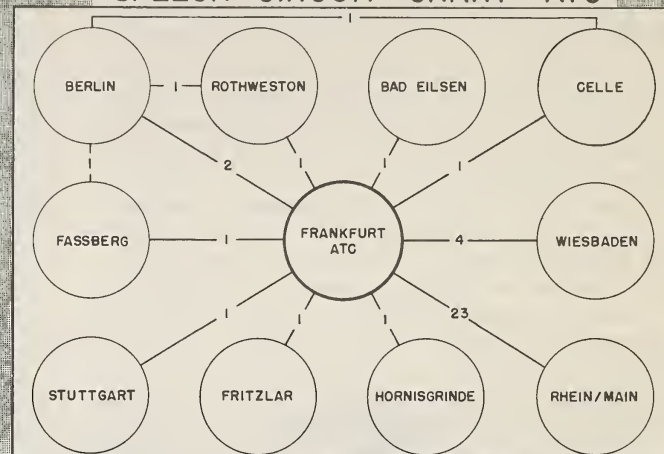
Weather-teletype circuits and voice-conference circuits

AIRLIFT COMMUNICATIONS NETWORK

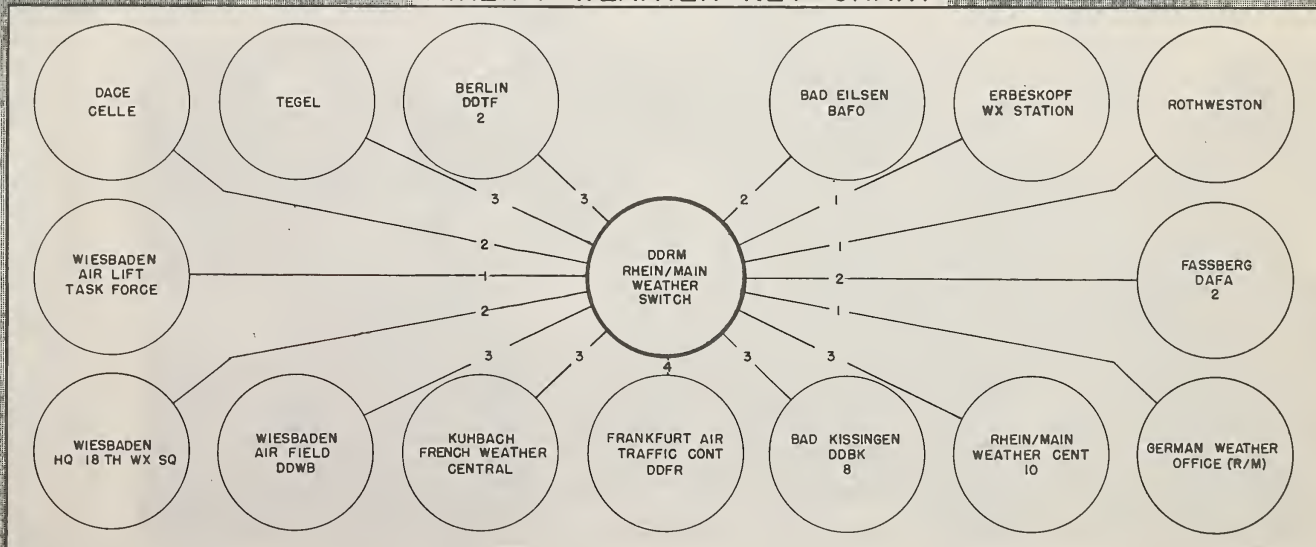
AIRLIFT OPERATIONAL VOICE NET



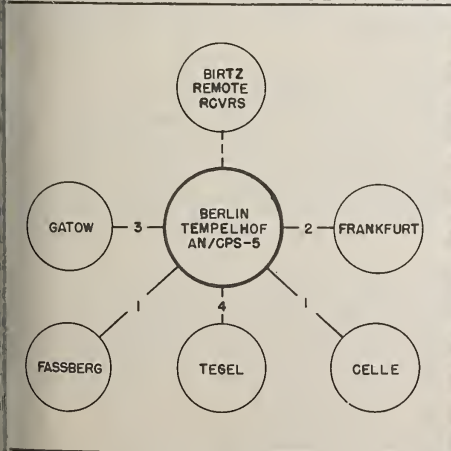
SPEECH CIRCUIT CHART-ATC



AIRLIFT WEATHER NET CHART



SPEECH CIRCUITS AIR TRAFFIC CONTROL RADAR



were installed in the weather office at the bases involved and Headquarters CALTF so that hourly conferences could be held in making forecasts and directing diversions.

Four-hourly reports were required by the Maintenance Control Section of that Headquarters as to the status of aircraft in commission. These reports were handled over the "hot line" system on a second priority basis. An AOCPT teletype system was also installed to assist in procurement of spare parts. Teletype drops were provided at each base and at the Erding Air Depot.

Because of the frequent use of telephones to coordinate between supply, maintenance, production control, traffic, and other staff agencies, and because of the speed required, full manual switchboards were found unsatisfactory.

Inter-office communication systems were in demand so that commanding officers could hold frequent conferences

with various division chiefs while in their respective offices. Similar systems were required for coordination between maintenance, production control, and supply sections.

A condition not generally known is that wire communication between Western Germany and Berlin was accomplished through the Russian Zone of Germany. Lines and repeaters were at the mercy of the Russians; however, good service without interruption was maintained throughout the operation. Plans were made for replacement of these circuits by the provision of FM links, a major project.

CONCLUSIONS

Engineering consideration should be given to the design of a small, light, air-transportable, automatic

telephone system with 200 automatic lines and three manual attendants' cabinets with a minimum of 20 trunk lines. Such equipment should be an integral part of a transport units'.

The policy of restricting the use of inter-office communications system equipment to control towers, crews, and other operational functions should be reviewed. A system similar to Webster Teletalks should be included as troop carrier T/O&E equipment to provide for the maintenance, production control, and supply staff functions. The loudspeaker system of "squawk boxes" is preferred as it permits personnel to continue without interrupting other duties such as entering statistics on blackboards, and eliminates the necessity for remaining at the instrument.

VHF/FM voice and automatic teletype facilities have become a major requirement in air transport operations.

LOW FREQUENCY RADIO BEACONS

To prevent international incidents, it was necessary for all aircraft to fly exact routes in the 20-mile-wide corridors. Fourteen low frequency radio beacons operating in the 200/400 Kcs band were installed for use with the radio compass AN/ARN-7 in the Berlin, Celle-Fassberg, and Rhein/Main - Wiesbaden areas. Other low frequency beacons were located several miles off the center line of all runways to permit instrument approaches.

The provision of mobile-type homing beacons for the Lift was necessary until final traffic control plans were completed and implemented. These beacons comprised an HO-17 shelter with duplicate BC-191 transmitters, RA-34 rectifiers, PE-197 power units, and other associated equipment.

The shelters were mounted on a 6 x 6 truck. Masts for the installation of the inverted "L" type antenna were provided. By using this type of mobile homing equipment it was possible to install beacons and make changes in locations in a matter of a few hours. As the Airlift operations progressed and requirements became firm, these installations were removed from the truckbeds and placed



RHEIN/MAIN TELETYPE COMMUNICATION CENTER.



RADIO BEACON, WIESBADEN AB.

on five-foot platforms to provide a more permanent type installation.

One of the disadvantages in the use of low frequency radio beacons for this operation lies in the limited availability of frequencies within this portion of the spectrum. The 200/400 Kcs band used for navigation is in many cases concurrently assigned to European broadcast stations. Because of the close proximity of the countries in this area, interference was a continuously mounting problem and brought complaints. It was a dangerous condition for air navigation in that many stations using these frequencies were of the non-directional type. Aids of this type could be installed only at the entrance to the corridor, as no ground navigational aids could be installed within the corridor over Russian-occupied territory.

Generally speaking, the BC-191 radio transmitter is incapable of satisfactory performance on a continuous

schedule. Even by operating two transmitters alternately at beacon sites, it was found that the transmitters, rectifiers, and power units were too light for the heavy duty required. Difficulty was encountered with frequency failures. All beacons were equipped with one keyer only; the lack of a second was definitely a handicap since the keying equipment was required to operate continuously. Any failure in the keying mechanism precluded beacon identification.

At RAF bases 300 W-type LM 300 transmitters were used. They were unreliable and frequently inoperative due to transformer failures. Difficulties were also encountered in obtaining the American spares necessary to maintain serviceability.

In September 1948 arrangements were made to have 21 T-5 beacons airlifted from the U.S. to replace the temporary BC-191 installations. They arrived in the theater about 1 February 1949. This type of equipment was necessary to maintain continuous operation and adequate radio coverage during the most adverse weather and atmospheric conditions. It was vitally important that adequate beacon coverage be available to maintain two- and three-minute intervals of aircraft space. The increased power of these new beacons presented problems of interference with the European radio broadcast stations in the 200/400 Kcs band. It was generally agreed that 500-Watt power was not necessary; however, 50-Watt power on the other hand is insufficient for positive operation under adverse weather and atmospheric conditions.

The greatest lesson learned from the use of low frequency homing equipment is that the Air Force equipment available is either over- or under-powered.

CONCLUSIONS

Future engineering and procurement should include a low and medium frequency transmitter which is capable of continuous operation with a minimum of maintenance through use of a higher safety factor. At least one new-type transmitter should be developed which is capable of continuous operation with an output of 300 Watts, with provisions for reducing power to 150 Watts.

LOW FREQUENCY RADIO RANGES

Only three low frequency radio ranges were utilized in Airlift operations. These were located at Rhein/Main, Fulda, and Tempelhof.

The low frequency radio range could be used for homing as well as fixed course navigation; however, its disadvantages made it undesirable as the prime means of navigation. These disadvantages include leg instability on loop-type ranges and the same problems encountered with low frequency beacons on the assignment of frequencies, as discussed above.

VHF RANGES

As the Airlift operation continued and the trend increased toward the utilization of VHF, it was desirable that these frequencies also be employed in radio navigational aids.

Radio ranges were used at critical points along the routes to provide safety, but medium frequency ranges were not entirely satisfactory due to atmospheric disturbances and other interferences. The need for VHF facilities was evident.

During October 1948 arrangements were made to obtain six VAR ranges from the Civil Aeronautics Authority (CAA) for use in Airlift operations. CAA civil and radio engineers were assigned to the Lift and travelled by air from the U. S. to accomplish the installations. One of the ranges was airlifted to the theater and five were transported by "MARINEX". The work of surveying the sites began about 15 October. By the end of January 1949 all of the installations were completed and operating. Their locations were:

- Fulda - (Zone-side of southern corridor)
- Braunschweig - (Zone-side of center corridor)
- Dannenberg - (Zone-side of northern corridor)
- Tempelhof - (Berlin-side of southern corridor)
- Lubars - (Berlin-side of northern corridor)
- Wolfenbittel - (to project a beam perpendicular to the southern corridor as a check point).

In general, the results of these facilities were considered very satisfactory although some difficulty was encountered in the siting. The final sites were such that the leg of the ranges could not in every case be projected down the center-line of the corridor. The transmission ranges, although not as great as desired, were within the line-of-sight characteristics of VHF. The outage of the equipment was negligible, and the reliability of received signals was considered good under all flying conditions.

Since all frequencies of the VHF transceivers were already being used in air/ground communications, it was necessary to utilize the "Glide Path" receiver for range reception. The "localizer" portion of this receiver was employed for this purpose and stations were received through channel selection.

Although it was desirable to install more of these stations at several important points along Airlift routes, their non-availability made this impossible. It was never possible to utilize more than one leg of any of the ranges installed due to the peculiar routes flown by Airlift aircraft. The Omni-directional Range would have been the ideal aid.

FAN MARKER BEACONS

In October 1948 it became apparent that fan marker beacons would be required for the precise navigation required in the operation. Although pilots were getting indications from the radio compass equipment when they passed the stations enroute, there was no precise indication as to when aircraft were directly over the station.

Requests were initiated on 23 October to install a fan marker beacon at each of the radio beacons and radio ranges then utilized on the Airlift routes. Since the equipment was not available in the theater, a supply requirement was placed upon the Zone of Interior. Because fan marker beacons were not immediately available in the United States, the procurement of this equipment became quite involved.

During the latter part of February 1949, the installation of the first fan marker beacon was completed at Frohnau. Equipment arrived at the sites at Celle and Staden during May, but the other installations were not completed because of the termination of the Airlift.

CONCLUSIONS

With precision flying and "tight" let-down patterns within a concentrated area, a positive indicating aid for beacon and range sites is a necessity.

AIR-GROUND/COMMUNICATIONS

The magnitude of air/ground operations can be visualized by the 6,000 daily contacts made at the Tempelhof Air Base by Airways, Control Tower, and GCA. This base is one of three bases in the Berlin area.

With certain exceptions, VHF was used exclusively in the control of Airlift operations. These frequencies worked very satisfactorily where range, static-free operation, and readability were concerned. However, the limitation of the equipment utilized was one of the drawbacks of the entire operation.

Due to the confined area in which it was necessary to maneuver the aircraft for landings on the three Airlift bases

in Berlin, the obvious mutual radio interference precluded the use of any frequency for more than one facility. To provide complete radar control of the aircraft from the time it was received from the corridor by the CPS-5 unit it was landed by use of GCA and given taxi and take-off instructions by the tower, four frequencies were required at each base. This meant that 12 frequencies were required in the Berlin area.

Certain British aircraft and U.S. C-47 aircraft during the early phase posed the greatest limitation as they were equipped with a four-channel set equivalent to the USAF SCR-522. Of the RAF aircraft, only the YORKS and HASTINGS were equipped with eight-channel equipment.

Another limitation of British equipment was its inability to tune through the frequency range of the AN/ARC-3 or above 125 Megacycles, where many of the USAF frequencies were provided.

Although it was not required that each Airlift aircraft possess all frequencies utilized in the Airlift, the possibility of diversions made it desirable to install at least five of these plus the frequencies used at the home base. To offset



AIR TRAFFIC CONTROL AIR/GROUND POSITION.



A POINT-TO-POINT COMMUNICATION CENTER.

this limitation it was necessary as far as possible to duplicate frequencies in the ground stations on a stand-by basis. In order to provide 100 per cent back-up required by Airlift policy, a very large requirement for VHF ground transmitters and receivers existed. The immediate answer to these limitations was the provision of more frequencies in the airborne equipment.

At the termination of the Airlift, plans had been completed to modify the ARC-3 eight-channel set to provide 16 channels. Although this was a step in the right direction, it can be visualized that many more frequencies should be used for such an operation.

It was found that definite requirements exist for air/ground communications between the aircraft and the maintenance activities.

CONCLUSIONS

The use of line-of-sight transmission with adequate standard VHF or UHF equipment is desirable for air transport operation. High frequencies can never be satisfactory due to static and "long haul" interference problems. Line-of-sight transmissions during the Airlift provided sufficient range without the disadvantages of HF.

GROUND CONTROL APPROACH SYSTEM

Possibly the greatest contributing factor to the success of the Airlift operations was the installation and efficient operation of GCA equipment at all Airlift landing strips. Two GCA units were installed and operated continuously in VFR conditions as well as IFR conditions to expedite landings of aircraft at all Airlift airfields. Instrument conditions prevailed generally between 70 and 80 percent of the time during the months of November through March.

In January 1949 the CPS-5 airport control radar set went into operation in the Berlin area to control traffic from the corridors to the three airfields in the Allied Sectors of Berlin. The CPS-5 controlled traffic from "reporting in" time until the aircraft turned on final approach at its destination and was then turned over to GCA Final. This made it unnecessary for the GCA personnel to monitor the



search scope and allowed them to concentrate all effort on aircraft making final approaches.

The greatest problem confronting the GCA program was the maintenance and overhaul of the GCA units. It was found that the GCA units used in the Airlift by the USAF had never undergone a 3,000-hour inspection and overhaul. Some of these units were as much as 4,000 hours overdue for a major depot inspection. In April 1949 depot overhaul and inspection was started on all GCA units in use.

During the early months of Operation Vittles, GCA had "operational outages" due to moisture collecting in the various components after the unit was turned off during standby periods. This trouble was cured by leaving the standby unit turned on during standby periods with exception of the high voltages. This kept the unit warm, preventing condensation; and the standby unit was ready for immediate use in case landing directions were changed.

CONCLUSIONS

GCA should be one of the first landing aids installed for landing aircraft in a small confined area where all types of weather are encountered. GCA units, time permitting, should have a major inspection and overhaul prior to heavy use.

AIR TRAFFIC CONTROL RADAR SYSTEM

In August 1948 it was found that as the number of aircraft increased, the problem of properly spacing aircraft entering the Berlin area increased tremendously. Under then-existing procedures, if aircraft were not spaced properly prior to arrival in Berlin, it would become necessary to stack them or to return the aircraft in the southern and northern corridors to their home bases. This in time would defeat the purpose of the entire operation. To conquer this problem it was decided to install a search radar system at Tempelhof. The installation was placed on top of the eight-story Tempelhof Airdrome building. This

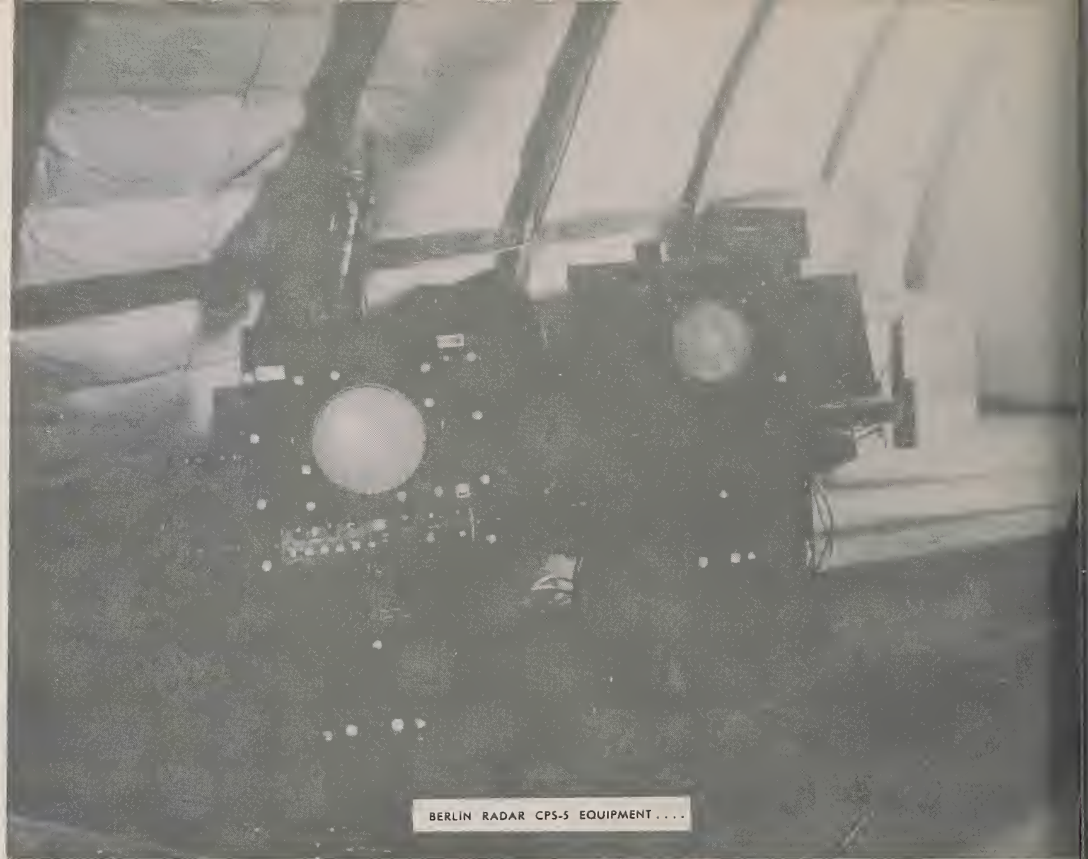
location is almost in the center of metropolitan Berlin; therefore, fixed or permanent echoes filled the entire radar scope for a distance of 10 to 15 miles, preventing the control of close-in aircraft. To eliminate this "clutter" on the scope an MTI (Moving Target Indicator) was installed. The unit went into full time operations during January 1949.

Included in the equipment arriving at Berlin was a video mapping unit. This unit was used to super-impose on the controller's scopes a map of the surrounding territory showing locations of local and remote runways, airfields, beacons, range legs, corridors, etc. These locations were prepared on special photographic overlays by hand, rather than by normal photographic negatives of a normal map.

In the "operations" room of the approach control system were the controller's scopes, SKIATRON, and data boards of edge-lighted Plexiglas or lucite. A search and "off-center" PPI (Planned Position Indicator) scope was provided for Tempelhof, Tegel, and Gatow airfields. The search scope showed all traffic entering the area and the "off-center" scope showed air traffic at the particular field to which the controller was directing traffic. The data boards showed the flow of traffic into each field and indicated the time "reported in" over an established point, the altitude maintained, times arriving at definite altitudes during let-down, time over the beacons, and time turned over to GCA Final or control tower at the destination. This information was placed on the board by a man behind the board writing in reverse with a grease pencil. Weather data for the entire area was also indicated.

Each controller had at his disposal communication channels to aircraft by VHF and HF radio frequencies and to the individual control towers and GCA units by land-line telephone. The SKIATRON unit is a very large PPI scope with a persistent screen to enable the chief controller to monitor all traffic in the entire area. Due to the precise traffic patterns used, the SKIATRON was of no great value to the Airlift operation at Berlin.

One of the largest problems encountered by the Berlin CPS-5 was identification of individual aircraft after they reported in. The CPS-5 does not receive IFF signals directly on the controllers' scope. The only method of identification worked out by the controllers was that of



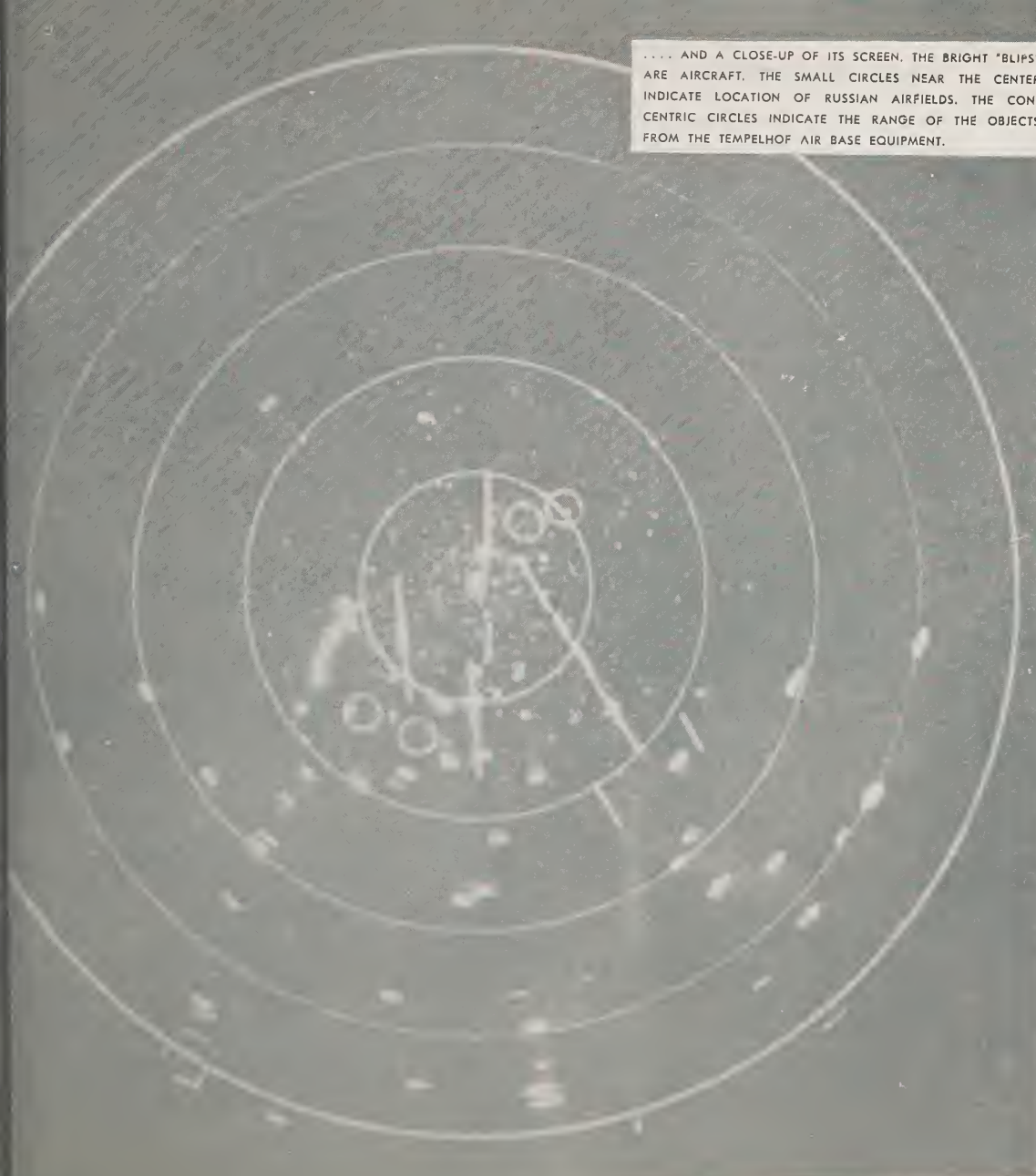
directing the aircraft to turn 45 degrees right or left for 45 seconds and then resume the normal heading to Berlin.

"Strobing" of the scopes by automatic VHF/DF equipment was not practical for identification of aircraft in an area containing a heavy flow of air traffic. This equipment, when used, places a bar of light or "strokes" on the scope from the center of the scope to the aircraft being DF-ed. When used in an area of heavy traffic, this placed so many lines on the scope that tracking of aircraft was very difficult. Also, with two aircraft transmitting simultaneously on

the same frequency, the strongest signal was DF-ed.

Altitude information was not needed and, therefore, was not incorporated in the unit. The vertical separation of aircraft on the Airlift was entirely dependent upon the pilot and the accuracy of the altimeter in the aircraft.

Maximum "positive" range on the Berlin CPS-5 was found to be 60 miles, positive range being that range at which the aircraft is first observed and stays on the scope until it lands. Some aircraft were observed as far out as 100 miles, but the returns on the scope were sporadic.



.... AND A CLOSE-UP OF ITS SCREEN. THE BRIGHT "BLIPS" ARE AIRCRAFT. THE SMALL CIRCLES NEAR THE CENTER INDICATE LOCATION OF RUSSIAN AIRFIELDS. THE CONCENTRIC CIRCLES INDICATE THE RANGE OF THE OBJECTS FROM THE TEMPELHOF AIR BASE EQUIPMENT.

CONCLUSIONS

With the success of the CPS-5 Radar Set in Berlin a proved fact, it is believed that radar can be better adapted to all phases of air traffic control—that is, airways control or area control, approach control, landing control, and taxi control. Excellent results were achieved with the area-control type of long-range radar, which greatly aided traffic channeled into the Berlin area. Furthermore, the need for a type of taxi control radar occurred many times.

IFF equipment capable of exact identification of individual aircraft is urgently needed, to avoid the necessity for turning of aircraft to effect radar identification.

AIRBORNE RADAR AND ASSOCIATED EQUIPMENT

The military requirements for airborne radar navigation equipment became apparent early in the fall of 1948. After careful consideration, the AN/APS-10 was chosen as the airborne radar set to be used on the Airlift. This choice was founded on the following reasoning:

- (1) The AN/APS-10 was already installed in MATS C-54 aircraft.
- (2) It was believed to be the most available equipment in large quantities.
- (3) It required less installation time.
- (4) It had a comparatively light weight of 200 pounds.

An initial survey of Airlift aircraft indicated that only a small percentage of assigned aircraft had AN/APS-10 equipment installed. Headquarters USAF advised that insufficient AN/APS-10 equipment was available for the entire fleet and proposed that the AN/APS-4 radar be installed after the stockpile of AN/APS-10 equipment was exhausted. This proposal was accepted, and arrangements were made for installation during the 1,000-hour inspections and recycling of aircraft. By January 1949, 53 percent of the aircraft had been equipped; by March 1949, 72 percent and in May the installation of AN/APS-10 or AN/APS-4 on all Airlift aircraft had been completed.

Radar Beacons, AN/CPN-6, for use with the AN/APS-10 and AN/APS-4, were located in storage at Burtonwood,

England, in November 1948. In December six complete sets of AN/CPN-6 were shipped to Erding Air Force Depot in Germany. During February 1949 Radar Beacons (AN/CPN-6) were planned for Rhein/Main, Tempelhof, Gatow, and along Airlift routes at Frohnau and Braunschweig. The AN/CPN-6 installation at Rhein/Main was completed in March and the Tempelhof installation in early June.

No critical problems were encountered in the installation of the airborne and beacon radar equipment. However, it was found that when the pilot's scope for the AN/APS-4 was pulled down in the operating position, a deviation of 40 degrees was introduced in the magnetic compass due to the magnetic field set up in the sweep coils of the scope. There was no apparent deviation when the pilot's indicator was left in the "stand-by" position, even though the AN/APS-4 equipment was in operation.

The complete use of airborne search radar equipment for navigation had not been made prior to termination of operations, since:

- (1) Crew personnel were not familiar with the operation and use of the equipment.
- (2) A lack of fully qualified radar mechanics for organizational maintenance existed.
- (3) Sufficient beacon equipment had not been installed.
- (4) No critical need existed for it.

CONCLUSIONS

The USAF should institute a vigorous program to bring all Troop Carrier and similar organizations up to full T/O&E strength in qualified radar mechanic positions, SSN's 849, 853, and 955.

All pilots and navigators assigned to organizations using airborne search equipment should be indoctrinated in the use of such equipment and required to undergo frequent refresher courses.

Every tactical multi-engine aircraft should be equipped with an airborne search radar set, employing the PPI method of presentation.

MOBILE RADIO EQUIPMENT

Ground communications at Airlift bases for the control of loading operations, maintenance, and dispatching of aircraft were found to be a very important factor in increasing the number of daily trips made by each group. Vehicles used for aircraft taxi control, maintenance, and cargo loading operations were directed by radio from a dispatch control center.

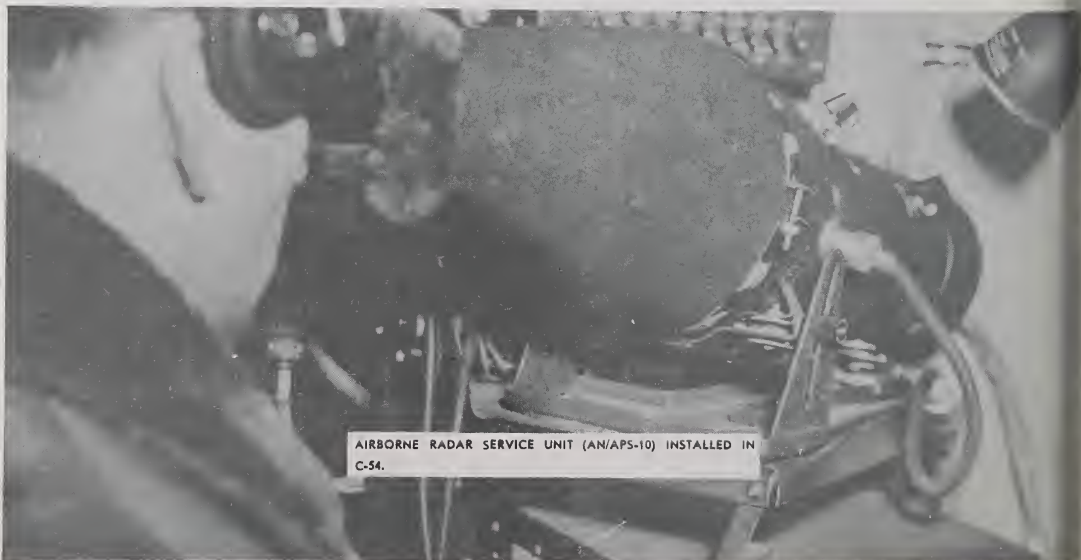
Three different types of mobile radio equipment were used in jeeps at different bases with the following results:

AN/VRC-1 Mobile Radio Equipment proved to be a very poor piece of equipment since it utilizes the SCR-542 VHF transmitter-receiver, which does not stay tuned properly when operated over bumpy roads and runways. Logistical support for the AN/VCR-1 was very difficult since the equipment was practically obsolete. For installation on jeeps, a special 12-volt generator and battery are required. The high frequency component cannot be utilized

satisfactorily. Maintenance of the equipment was exceedingly great and interfered with other communications maintenance missions.

SCR-610 Radio Sets also proved very unsatisfactory. Vibration and bouncing over rough roads and runways easily de-tuned this equipment. Logistical support for this radio equipment had to come from Army sources and maintenance parts were almost unobtainable. Maintenance of the equipment was excessive. Four of these sets were obtained in February 1949 for Fassberg RAF Station; one set was converted for fixed station operation and three sets were installed in jeeps. Operation logs on this equipment indicated that the mobile equipment was operative less than 50 per cent of the time.

VRC-2 FM Motorola Radio sets were originally designed as police radio sets and have been used by Air Force units as guard vehicular radio equipment. Although these radio sets are not the perfect military equipment, they proved to be the best available for Airlift operations.



AIRBORNE RADAR SERVICE UNIT (AN/APS-10) INSTALLED IN C-54.

MOBILE RADIO EQUIPMENT FOR TAXI CONTROL. THE SET IS A VRC-1.



Reports indicated that this equipment would operate over a long period of time with a minimum of maintenance. Transmitter and receiver equipment remained stable in travel over rough roads and ramps. This set is designed for six-volt operation and while an oversized six-volt generator is desirable, it can be operated with existing jeep equipment. Shock mountings, dustproof coverings, and satisfactory antenna equipment are provided with this radio set.

CONCLUSIONS

There is a very definite need for a minimum of one fixed station and three mobile radio sets for each troop carrier group or separate squadron, to permit expeditious handling in dispatching of aircraft. Back-up equipment for the fixed radio station should be complete, since any failure will result in decreased efficiency.

The immediate need for mobile radio equipment should be considered and every effort made to have adequate six-volt equipment available for mobile radio stations when the new UHF Radio Frequency Plan becomes effective. Consideration should be given to the desirability of engineering the proposed multi-channelled airborne UHF equipment so that it can also be used as

vehicular and fixed station equipment in conjunction with proper power supply units. This would simplify logistic support and provide optimum flexibility.

Any operation which requires the immediate maintenance and dispatching of large numbers of aircraft should be provided with mobile radio equipment. Information from the ramp on the condition of aircraft is always required by production control officers or flight control officers to ascertain the condition or status of all aircraft under their control. The use of high frequency for this purpose is unsatisfactory due to the circuit congestion and interference within the high frequency spectrum and due to the undesirability of transmission beyond the base perimeter.

Line-of-sight transmission within a base area by the use of UHF permits reemployment of the same frequencies by adjacent bases which lie beyond line-of-sight coverage. UHF has the added advantage of easy maintenance, less weight, less cubage, and stability of frequency.

A multi-channelled set would also reduce interference by the assignment of a separate frequency for each function. It would provide communication between the aircraft and control towers, maintenance squadron, parking and loading jeeps, and production control. Since this problem has arisen in the past without a satisfactory solution, some study should be given to the development of adequate equipment and to the assignment of sufficient quantities of equipment to each Air Force group or squadron concerned.

Any of the above equipment procured for Air Force use should be designed so that power supplies would be provided for either six-volt DC, 28-volt DC or 110-volt AC power.

RAF NAVIGATIONAL AIDS

REBECCA-EUREKA

This system was a primary navigational aid used by those RAF ground installations located to give continuous coverage for all aircraft flying above 1,500 feet. The restricted radar range of the equipment made it impracticable

to give complete coverage along the corridors for aircraft flying below this level.

In addition to the beacons sited as navigational aids, two were installed at Gatow, the British airfield in the Berlin area, to indicate the points at which aircraft were to turn onto the final leg of the landing pattern.

The results generally obtained from this system were excellent; ranges depended largely upon altitudes assigned to the aircraft and varied from 20 miles at 1,500 feet up to about 60 miles at 5,000 feet. The use of this system, which proved to be very accurate, made it essential to carry a navigator as the equipment cannot be operated from the pilot's position.

The RAF found this system of navigation of great advantage in the operation particularly since with it, position fixes could be obtained under IFR conditions.

BABS

This aid was installed at all RAF fields and at Tegel Airfield in the French Sector of Berlin. Sites were chosen at the ends of every runway at each airfield.

Although there were a certain number of disputes regarding the accuracy of the "touch-down" point given by Babs, this aid proved invaluable.

GEE

The Central German Gee chain was used throughout the operation. Since this chain was installed before the Lift started, it was not sited to give coverage at low altitudes over the Berlin area. Consequently, no accurate fixes could be taken within approximately 20 miles of that city. Good fixes were generally obtained in the Western Zone, south of a line running approximately from Hamburg to Lubeck and along the central corridor as far east as about fifteen miles from Berlin.

Gee is a reliable and accurate navigational aid only if the topography of the area is such that the ground station can be sited so as to enable aircraft at any altitude to take reliable "fixes".

NUMBER OF GCA CONTROLLED LANDINGS

		TOTAL	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
TEMPELHOF AIR BASE	VFR	10 090	9	666	510	723	516	327	124	571	928	1 198	1 345	1 246	1 196	619	90
	IFR	17 089	52	120	497	1 235	1 725	2 073	2 256	2 220	1 482	1 236	1 005	1 309	1 492	197	190
	BELOW IFR	3 067	30	0	44	267	62	396	661	492	447	176	26	132	224	65	3
TEGEL AIR BASE	VFR	4 715	*	*	*	*	*	126	37	79	391	593	1 467	1 699	320	1	*
	IFR	8 598	*	*	*	*	*	641	1 124	1 335	1 026	616	1 034	1 562	1 258	0	*
	BELOW IFR	465	*	*	*	*	*	174	65	165	29	3	6	11	12	0	*
RHEIN/MAIN AIR BASE	VFR	4 330	0	25	0	148	135	77	245	293	196	1 009	778	507	529	279	107
	IFR	5 338	53	34	70	234	973	965	1 013	1 016	395	0	159	150	0	141	133
	BELOW IFR	57	0	0	0	0	57	0	0	0	0	0	0	0	0	0	0
WIESBADEN AIR BASE	VFR	6 300	65	692	2 265	650	525	159	197	124	157	301	523	1 124	436	556	306
	IFR	4 649	0	0	855	41	649	796	550	672	172	133	329	102	14	251	65
	BELOW IFR	8	0	0	0	0	0	2	2	0	0	0	0	4	0	0	0
FASSBERG RAF STATION	VFR	3 634	*	*	345	52	0	101	146	339	479	516	577	452	464	141	*
	IFR	5 649	*	*	0	215	932	497	734	659	462	496	559	549	440	106	*
	BELOW IFR	326	*	*	0	229	0	6	0	3	0	0	0	0	64	4	*
CELLE RAF STATION	VFR	2 111	*	*	*	*	*	34	525	390	117	324	327	140	241	13	*
	IFR	3 882	*	*	*	*	*	29	492	625	464	451	560	584	451	6	*
	BELOW IFR	37	*	*	*	*	*	0	2	3	2	26	0	1	3	0	*
TOTAL	VFR	33 180	94	1 403	3 120	1 773	1 176	826	1 274	1 796	2 270	3 943	5 017	5 168	3 208	1 609	503
TOTAL	IFR	45 205	105	154	1 422	1 725	4 279	5 001	6 169	6 729	4 003	2 932	3 666	4 256	3 655	701	408
TOTAL	BELOW IFR	3 960	30		44	516	119	578	750	663	478	207	32	148	323	69	3

* NO USAF OPERATIONS



INTRODUCTION

Of all the difficulties facing the Airlift, the factor constituting one of the greatest single problems was weather. Low clouds, fog, freezing rain, turbulence, and ice were contingencies of great operational significance; and they posed problems that had to be met and overcome before the accomplishment of the Airlift mission could be realized. With this fact in mind, Airlift planners throughout the early days of the Lift prepared the flight procedures, traffic control measures, and landing aid installations that enabled the Airlift to operate in weather conditions well below established Air Force minima.

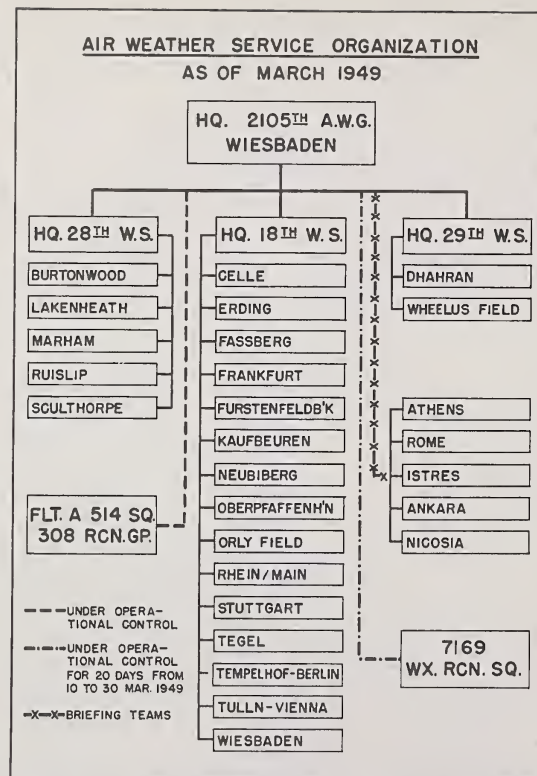
With the establishment of the Airlift's reduced operating minima, the Air Weather Service was called upon to observe and forecast within heretofore little needed ceiling and visibility limits. Before this, in the weather service, when ceilings were in the neighborhood of 200 feet and visibilities near $\frac{1}{2}$ mile, airfields were well below the closed minima and there existed no great operational requirement to know whether the ceiling was actually 250 feet or the visibility $\frac{3}{4}$ mile instead of 200 feet and $\frac{1}{2}$ mile. Under the Airlift's urgency, this situation was changed. Operations demanded knowledge of the exact ceiling and visibility, for 50 feet of ceiling or $\frac{1}{4}$ mile of visibility either way could open or close an airfield; and further, they demanded exact forecasts of such ceilings and visibility for a minimum of three hours in advance.

Such accuracy is not possible in the present state of meteorological science. The Air Weather Service, however, willingly concentrated the best available in personnel and equipment in an effort to approach as nearly as possible the standard of accuracy required; and as a by-product of this concentrated effort, new ideas and techniques were developed and tried, and shortcomings discovered and corrected. As a result of this unique, invaluable experience, the Air Weather Service has, without doubt, gained knowledge and experience that will enable it to render increasingly better service.

ORGANIZATION

Before the Airlift began, weather service requirements for Military Air Transport Command and for the United States Air Forces in Europe were met by a single weather squadron. With the beginning of the Airlift, this squadron, the 18th, found itself almost without warning faced with a sudden and tremendous increase in the demand for its services. The weather stations at Wiesbaden, Rhein/Main, and Tempelhof had been able to provide the necessary weather service for the few daily trips into Berlin within their normal commitment, but there was now a requirement for a special weather service that could observe and forecast, as well as brief aircrews, for a steady 24-hour-per-day stream of traffic. In addition to the increased traffic it became apparent that the Airlift's low operating minima dictated the need for special attention to the Airlift area; i.e., if forecasts of useable accuracy within sub-GCA limits were to be achieved, special observations would have to be taken, special charts and maps drawn, and special forecasts made.

Within the same period, since the Airlift was in the process of organizing and expanding, Task Force planners

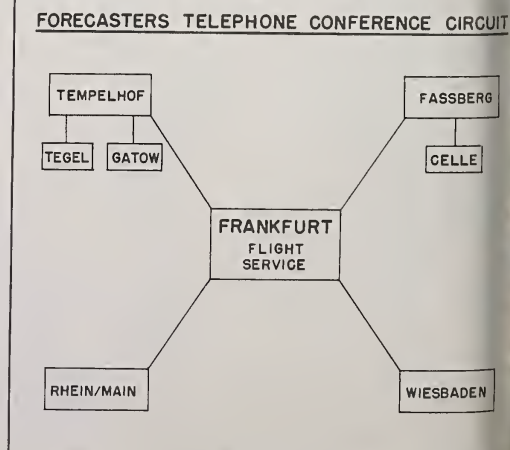
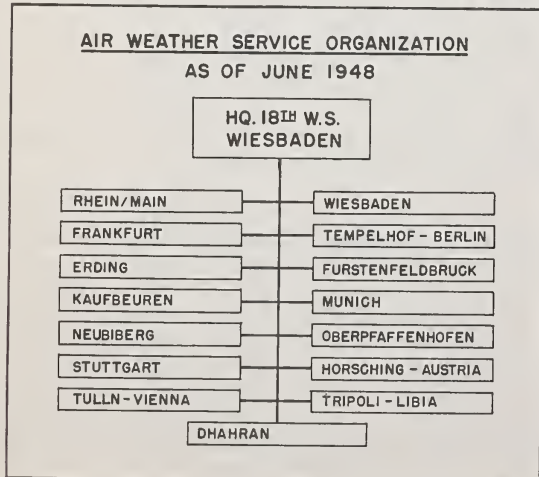


began calling upon the Weather Service for longer and longer period forecasts in their efforts to determine the needs in personnel and aircraft for the oncoming winter's operation. These increased requirements were apparent to the Chief, Air Weather Service, during his tour of the Airlift in November 1948. He authorized the personnel increase necessary to expand the weather squadron to group status. The Weather Service in Europe was thereby increased to three squadrons, the 18th serving the Airlift and Central European area, the 28th serving the United Kingdom, and the 29th in Tripoli and Dhahran. This re-

organization relieved the 18th of its excessive workload. With the increased personnel resources, new weather stations were opened and existing stations strengthened for long-term operation under the Airlift load.

EFFECTS OF WEATHER

The splendid success of the Airlift, its precise Air Traffic Control system, low operating minima, and unsurpassed tonnage record are likely to convey an erroneous impression of the effect of weather upon the operation. The Airlift operated in low ceiling and visibility conditions, icing and turbulence aloft, and icing on the surface, yet seldom completely stopping for weather — nevertheless weather was the largest of the factors determining the total delivered capacity of the Lift. Tonnage and bad weather conditions, considering the same number of operating aircraft, were indirectly proportional throughout the entire operation. (See Weather and the Frankfurt-Berlin Airlift Chart). Although the Airlift was seldom completely stopped by weather, instrument weather conditions did require extended intervals between aircraft, thus reducing



the number of trips that could be landed in Berlin during the adverse weather period and constituting weather's greatest effect.

Of the times when the Lift was halted by weather, the weather phenomenon mostly responsible was fog. Percentage tabulations, based upon an operating potential of 24 hours per day for each of seven Airlift airfields, show the largest percentages of closed weather as occurring during the months of November 1948 and February 1949 (see Weather Percentages for USAF Airlift Operation); and these were the two months in which fog was the major light hazard.

On two short occasions a single field was forced to suspend operation because of turbulence. Taken overall, little effect upon in-flight operation was caused by rough air. There were, however, reports from maintenance personnel to the effect that during periods of heavy turbulence, gas leaks in the C-54 wing tanks became more common and a larger amount of maintenance work was required.

Icing aloft, although anticipated to be one of the major in-flight hazards, proved to be of little difficulty. The operation has conclusively proved that the present anti- and de-icing equipment, if kept in proper operation, can safely handle any in-flight icing occurring in this area.

FORECASTING

One of the major problems facing the Air Weather Service, one that has been a difficulty since World War II demobilization, was the low level of experience among weather service forecasting personnel. The first move by the 18th Weather Squadron personnel office to meet the Airlift's forecasting needs was the transfer of European-experienced personnel from weather stations in the southern zone of Germany into Airlift fields. By carefully canvassing forecasters' experience throughout the entire squadron, the bulk of European experience among the forecasting personnel was concentrated on the Airlift.

Early in the operation it became obvious that special weather organizations and services would be necessary if operational commanders were to realize full benefits

of a weather service organization. The Airlift was beginning to operate as a single unit, with each base acting as a part of the whole rather than as an individual organization. To fit into this picture, the Weather Service had to do likewise. It had to be able to present to the Air Traffic Control center a single forecast agreed upon by all station forecasters, covering all Airlift bases and routes. To achieve this, a master Control Weather Station was established in the Frankfurt Air Traffic Control Office with a sub-central station in the weather office at Tempelhof. A telephone conference line was established with outlets in each weather station on the Lift, and a conference schedule set up so that all Airlift forecasters could discuss the weather situations at least four times a day and arrive at a composite forecast for the Lift area. The Master Control Station was given forecast control authority so that agreements could always be reached. Of the several values obvious in this conference net, the greatest was the combining of experience of the forecasters taking part. Regardless of the care exercised in selecting the most experienced forecasters for the Airlift bases, there existed a considerable difference in the experience level of personnel on duty in the various stations at any given time. The telephone conference circuit gave all forecasters the benefit of the most experienced man's opinions and reasoning and acted, in effect, as a means of bringing the experience level of all forecasters on duty up to that of the most experienced man. (See diagram in Communications section).

This conference proved of such value in the American weather service that an effort to accomplish a similar circuit between the American and British weather services was begun, and was just ready to begin functioning at the Airlift's end. Although no operational benefit was obtained, there is little doubt that this inter-service conference net would have accomplished a worth-while improvement in the joint weather services proportional to that accomplished in the U. S. weather service alone.

To those not technically trained, it may appear that this report lays undue stress on experience among weather forecasters. It is therefore advisable to explain here that the limited development of the science of meteorology

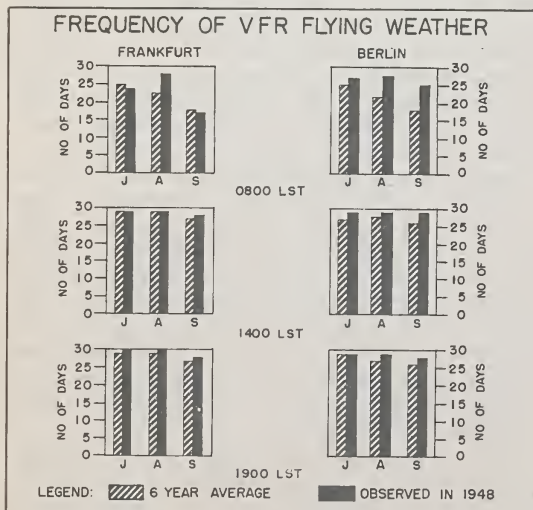
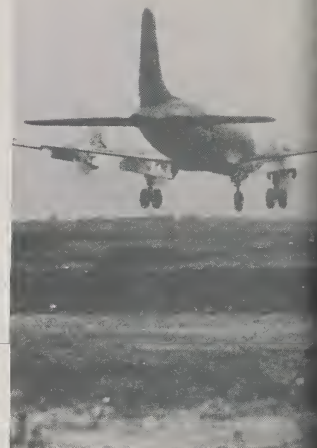
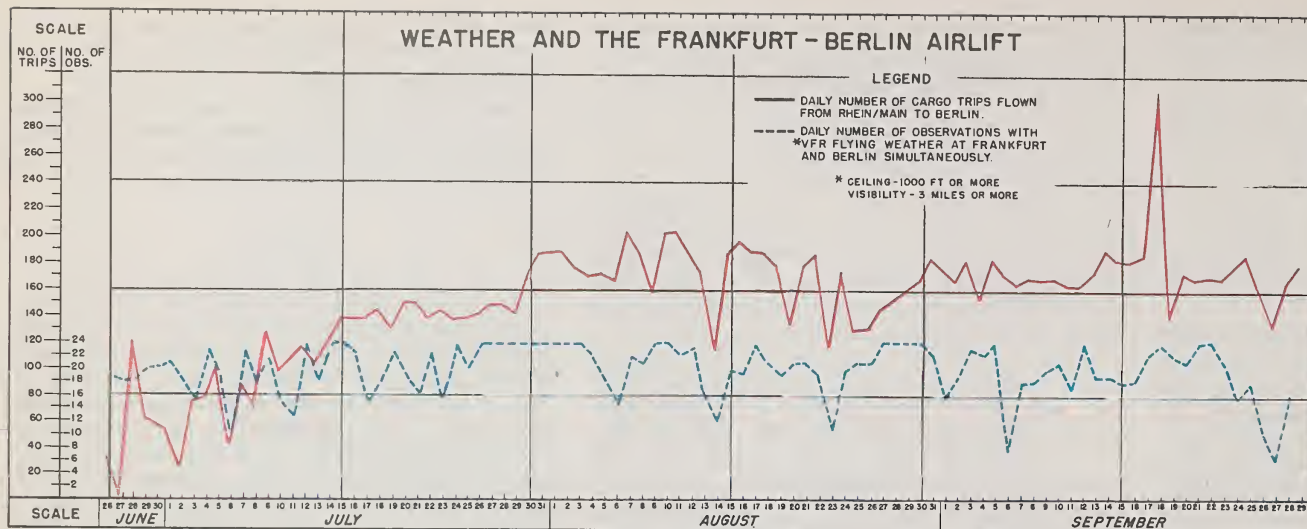
places perhaps more weight upon forecaster experience, particularly experience in the operating locale, than upon any other phase of training.

There were many new ideas and methods in the science of forecasting developed and tried by Airlift forecasting personnel, but due to their highly technical nature it is not considered advisable to present them here.

OBSERVING

As previously mentioned, the real winter weather began in November. At this time the Lift was operating with the minimum conditions of 200 feet 1/2 mile except Tempelhof, at which minima were 400 feet and 1 mile. At most of the fields, weather observers during this period were relying almost entirely upon estimated ceiling heights. Some ceiling lights were in operation for night observations, and infrequent ceiling balloon runs (due to shortages of supplies) were made for the accurate determination of daytime ceilings. Due to the amorphous and variable nature of the average low cloud and the natural limitations of the human eye, it has always been understood by weather people, though perhaps not by most operational personnel, that an estimated ceiling of 200 feet means that the ceiling is somewhere between 150 and 250 feet. Even those measurements made by ceiling light or balloons, due to the aforementioned causes, have been known to be inaccurate by as much as plus or minus 50 feet. It was obvious that the Airlift's low landing and take-off minima dictated the use of ceiling measurement equipment which could not only make accurate measurements, but make them continuously; so that dependable ceiling heights would be readily available for operations under those conditions. The Chief, Air Weather Service, during his earlier mentioned tour of the Airlift, recognized this necessity and authorized the installation of new type weather service ceilometers at all Airlift bases, giving them immediate priority for this job.

Except in rare cases, the regular report of visibility made by a weather observer is normally the general all-around visibility taken from the weather station, with a



special note for more or less visibility in any particular quadrant if it deviates as much as 1/2 mile from the general visibility. With the Airlift operating at 1/2 mile, the runway visibility might frequently differ from the average by an amount not large enough to require a remark on the weather report, yet enough to open or close the runway at Airlift minima. To obtain a special observation which would give the accurate runway visibility, a line for a field telephone was installed at the landing end of the active runway. When the visibility was less than one mile, a weather observer with a field telephone was stationed in this position. By counting the visible runway lights, with a knowledge of the distances between them the observer in this position could telephone accurate runway visibility reports direct to the weather office. Any variation in runway visibility which might open or close the field was thus instantly available to the weather office, and through them to operations personnel at all Airlift bases by way of the weather teletype net.

UPPER AIR AND AERIAL RECONNAISSANCE

When forecasts were begun to supply the Airlift with special weather service, one of the first points of consideration was the upper air observation program. Perhaps one of the weakest links in the 18th Squadron's observation service was their shortage of upper air data. Use was being made of such foreign observations made by PIBALS (pilot balloons) and RAWINS (radio-equipped balloons) as were available, and a few strategically located stations in the U. S. zone of Germany were taking these observations and transmitting the information on the international weather net. The British were making several upper air runs in their zone of occupation and likewise transmitting on the international net, so that as far as the American and British zones of Germany were concerned, upper air information for a normal Air Force operation was available. When the Airlift started, it was only necessary to increase the frequency of these runs to provide adequate coverage of the air aloft over the

British and American zones.

Even with the increased frequency of upper air runs, it became apparent with the advent of November weather that more information was necessary for the longer range forecasts required by the Airlift, and that this added information must come from a specific locality — the area to the northwest, or "weatherward," of the Airlift corridors. Ground controlled balloon runs in this area were entirely too scattered in the low countries and northern France, and few or none were being made in the Channel and the North Sea.

As a result of requests made by the weather organization, a squadron of B-29 reconnaissance aircraft was formed and based in the Marham area of the United Kingdom. A weather reconnaissance track was recommended, and operations by this squadron began in late November. Their route was set up from Marham north-eastward to the coast of Denmark and back in a triangular track that completely covered the Central North Sea and Central and Southern England. Qualified weather observers on these flights reported over predesignated check points, and their reports were coded and put on the

weather service wires. This was information of real forecasting value because, with the predominantly north-westerly circulation during the winter, the flights were encountering the weather that would be over the corridors in 24 to 48 hours.

The value of these reconnaissance flights to Airlift weather forecasting can be reduced to a simple lesson: If adequate upper air information is unavailable from already established RAWIN and PIBAL stations, this information can be obtained by aerial reconnaissance more expeditiously than by attempting to establish and man the necessarily complex upper air observation stations. Aerial reconnaissance ships can cover a much larger area, and thereby give more complete upper air coverage, than could conceivably be covered by the establishment of even a large number of observing stations. At the same time they can render valuable service in obtaining the data necessary for special studies in aircraft icing, thunder storms, and other specific meteorological phenomena. Although aerial reconnaissance does not generally provide information to as high a level as that supplied by RAWIN's it proved adequate for the Airlift, especially

when combined with data supplied by a minimum number of RAWIN stations.

With the North Sea and coastal countries adequately covered by the B-29 Weather Reconnaissance Squadron based in England, attention was turned to a more general weather reconnaissance of Central Europe. In November 1948 USAFE formed a squadron of B-17's, the 7169th Weather Reconnaissance Squadron, with the intention of placing it under the operational control of the Air Weather Service as was the B-29 squadron at Marham. Headquarters USAFE placed this squadron under Task Force operational control as an Air Traffic Control scout squadron, with the weather squadron permitted to place weather observers on these flights. Little benefit was realized as far as weather forecasting was concerned by this arrangement, because flights by these aircraft were confined to the Airlift corridors. Since a satisfactory arrangement had not been worked out to serve both interests, on 10 March operational control of this squadron was placed with the Air Weather Group. Twenty days later, due to improved weather conditions and the questionable value of the results obtained, this recon-

"NOR RAIN, NOR SLEET, NOR SNOW SHALL STAY THESE
COURIERS FROM THEIR APPOINTED ROUNDS".



naissance squadron was inactivated by order of USAFE.

Although no particular value was obtained by this operation, it was established on the two or three occasions when these aircraft flew tracks outside the corridors to the weatherward, that a similar squadron operating entirely under Weather's operational control could play the same part and return the same value as the squadron in England; and by flying to the weatherward nearer the corridors, would encounter the weather that would be over the route in the next six to twelve hours, thereby increasing by a substantial degree the short-range forecasting accuracy.

PILOT REPORTS

For those aerial observations near the bases themselves and along the corridors, the usual system of pilot reports was used. When the bad weather started, Air Weather Service requested that pilots be required to report weather at designated intervals. These reports were collected and placed on weather service wires, and a system for the utilization of pilot reports was effected much the same as the Civil Aeronautics Administration and Weather Bureau set-up in the Zone of the Interior. Perhaps the greatest difficulty encountered in this system was that of busy communication personnel being unable to relay weather information from the pilot to the weather office. Such a hold-up caused a consequent delay in dissemination of the reports over the weather service wires. When the final organization allowed a workload reduction for communication personnel, this difficulty disappeared.

One of the points of friction that has long existed between weather officer and pilot is the matter of pilot ceiling and visibility reports. The Air Weather Service, like the U. S. Weather Bureau and CAA, has heretofore followed regulations that forbid the weather officer accepting a pilot report as the official report, when an observed report by a qualified weather observer could be had. In perhaps one of the first large-scale deviations from this rule, weather stations on Airlift bases found it mandatory that as often as possible, they accept pilot

reports on ceilings and visibilities. This was especially true before the installation of electronic ceiling reporting instruments and the inauguration of a special runway visibility observation. Even with the large human error factor involved when a pilot is busy with an instrument let-down, there were several reasons for the necessity of accepting pilot reports.

First, with the ceiling as variable as it usually is when at or near 200 feet, it is impossible without making continuous observations (or without the use of a ceilometer) for the ground observer to be absolutely current with his ceiling and visibility; and with aircraft landing

or taking off at less than five-minute intervals, it would have been necessary for the observer to be outside continuously in order to meet the Airlift's requirements.

Secondly, since most of the Airlift weather stations were in offices from which the observers could not keep a constant watch on the sky in all directions, they were often forced to rely on the pilots, through the tower, to let them know when special observations were in order. In this respect, it is here strongly recommended that the physical location of a weather station be such that a clear and unhampered view of 360 degrees of the horizon can be had at all times.

OPERATIONAL USE OF FORECASTS

Perhaps the best picture of the operational use of forecasts and the weather forecaster's position in the general operations picture can be drawn by a comparison between use of the weather services by the two nations engaged in "Operation Vittles". American and British weather services were very similar, it being in this instance the operational use of forecasts where the major differences occurred. The United States Air Force C-54's, due to tank and wing construction, were better stressed with a minimum of 1,500 gallons of fuel in the wing tanks. This constituted a considerable fuel reserve over that necessary for the shorthaul operation. With this reserve fuel, U.S. aircraft could be dispatched without regard to terminal forecasts. Aircraft could continue to make approaches until the field had actually gone below minimum. When the field did go below minimum, there still remained adequate fuel aboard for the aircraft to return to their home bases or to alternates. Therefore, for the most part forecasting was used for dispatching aircraft so they would arrive at terminals as weather rose to minima, and for estimating icing and turbulence hazards en route.

On the other hand, the British operation was conducted with aircraft carrying a minimum of reserve fuel. They were therefore unable to divert the sometimes necessary long distances in order to reach operational weather conditions. British traffic controllers were forced to rely more completely upon weather forecasts; and in contrast to the



American operation, they stopped dispatch when weather personnel were able confidently to forecast below-minimum operational conditions.

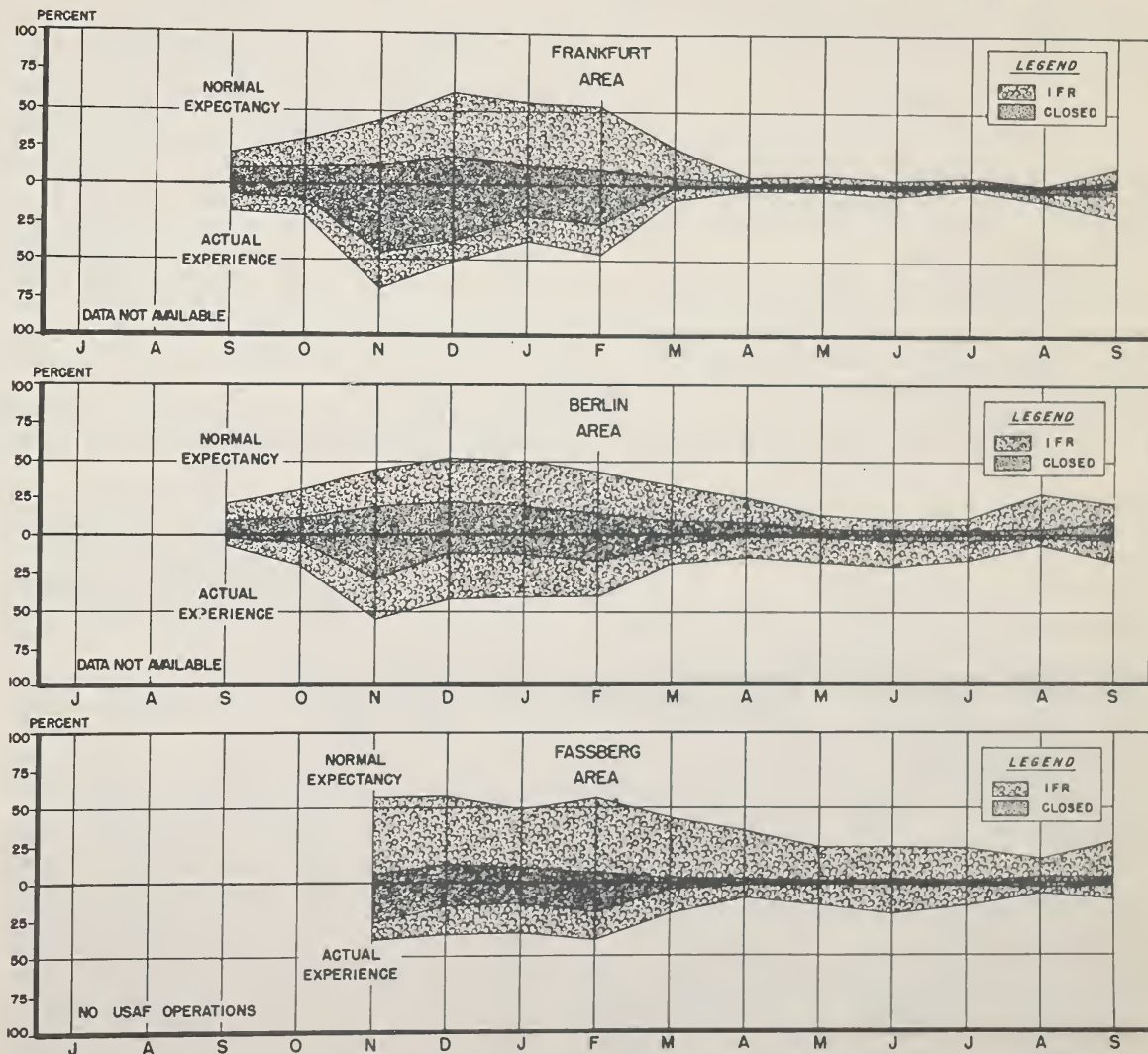
As a partial solution to the recognized inaccuracies of meteorological science, both British and American forecasters exercised their initiative by warning the dispatcher of weather features likely to affect the operation. Based upon an adequate knowledge of the nature and urgency of the operation and the controller's problems, they presented a balanced picture of the future weather with their degree of certainty for the forecast. Forecasters often filled an easier and more productive role in being confidently able to forecast the continuance of good weather when crews and controllers felt doubts and anxiety.

RECORDS AND CLIMATOLOGY

One of the most productive roles filled by the Air Weather Service, as well as one of the best illustrations of the value of maintaining longterm records and statistics, was in the field of special studies and special forecasts. Studies in answer to many difficult problems, including probable and possible duration of periods when GCA teams might be continuously employed; European meteorological conditions involving fog, icing, thunderstorms, seasonal freezing levels, and statistics regarding snowfall, rainfall, and estimates of the effect of winter weather on aircraft were prepared. Papers such as these were continuously in demand at command level and proved to be of singular value to headquarters engaged in over-all planning.

Airlift logistical problems were to a large extent affected by the weather. Because considerable portions of the supplies for Berlin were of a perishable nature, and could not be held at air bases during periods of bad weather without causing far-reaching effects upon surface transportation facilities, long-term climatological studies and extended-interval forecasts enabled ground traffic agencies to plan the flow of supplies to Airlift air bases. Forecasts were given the Traffic and Production Control Sections of CALTF Headquarters for weekly, monthly and

AIRLIFT AREA CLIMATOLOGICAL TRENDS



three-monthly periods. By utilizing these studies, logistical agencies were able to plan the delivery of supplies to the American and British Zone Airlift stations so that an even flow could be kept moving into Berlin.

DISSEMINATION

To be fully utilized, weather observations and forecasts must be disseminated with speed and accuracy. On the Airlift this was accomplished through the media of staff briefings, special staff weather sections, crew briefings, and written forecasts.

Weather briefings were presented at practically any time or place they were needed. The Commanding General, Headquarters USAF, was briefed daily at 1000 hours and the Commanding General, CALTF, at 1100. Both of these briefings laid stress on the expected Airlift weather and its causes.

A staff weather officer was assigned to Headquarters

CALTF for procurement and presentation of additional weather information. Under his supervision there was a special weather section in the flight operations office of that Headquarters. There, for the use of the Duty Operations Officer, a board displaying present and forecasted weather for all Airlift bases and alternates was maintained from telephone and teletype reports. Weather overlays, written forecasts, and a telephone conference connection with CALTF bases enabled the staff weather officer to advise and brief Airlift personnel on request.

Beginning with a system of twice-a-day group weather briefings, Airlift bases progressed to a system of individual briefings immediately prior to take-off, if the location of the weather station and time factors made this procedure practical. In those cases where the distance of the weather station from the flight line made individual briefing between trips impractical or where the size of the weather station made group briefings impossible, written forecasts covering a six-hour period

were published every three hours and distributed in organization mess halls and all the flight lines. Where used, the pre-take-off briefings were supplemented in a mass briefing held once a week to discuss general weather trends, changes in flight procedures, and intelligence matters.

The Airlift terminals at Tegel and Gatow both maintained briefing services, although regular briefing operations were normally unnecessary because of the short routes these bases served. Tempelhof initially had individual briefing in the terminal building, but converted later to a system of "portable" briefing, first from a jeep and later from an inclosed van in which the weather officer met arriving aircraft, briefed crews at the parking sites, and returned to the station during breaks in traffic to pick up later sequences and forecasts. The arrangement was most convenient for all concerned, especially in inclement weather.

TECHNICAL ASPECTS

Germany, with the latitude of Labrador and the temperature of the U.S. middle east coast, presents one of the most difficult forecasting areas in the world. During the winter the proximity of the warm Gulf Stream and the cold North Sea causes inter-mixture of air masses of widely varying temperatures and humidity, and frequent frontal passages with inconsistent rates of movement make accurate forecasting a major problem. The primary problem, however, and one that has proved intractable so far, is forecasting in and near marginal operating conditions.

Advances have been made in the technique of bad weather flying, and marginal conditions are now so near to zero conditions that they cannot be forecasted or even observed with absolute accuracy. Marginal operating conditions — 200 to 400 feet ceilings and 1/2 to 1 mile visibility — are so narrow from the viewpoint of the meteorologist that accurate forecasting within these limits is usually improbable. With cloud bases within this range a variation of 200 feet is of great operational importance; yet it can result from a change of only 1 degree Fahrenheit in surface temperature or a few knots change in wind

TEMPELHOF GAVE PILOTS QUICK, COMFORTABLE "CURB-SERVICE" BRIEFINGS.





MARCH, 1949, BLEW INTO RHEIN/MAIN WITH SNOW AND ICE.

force. A variation of 1/4 mile in visibility may be similarly caused.

These difficulties have been aggravated by the fact that cloud bases below 600 feet are normally so diffuse and fluctuating that even air crews are unable to observe the effective height with any useful degree of unanimity, so that individual air crew reports of the height of low clouds are sometimes misleading and always have to be regarded with reserve. For this reason crews and controllers seldom agree with forecasts of low stratus height.

The timing of sudden changes of weather within one hour has hitherto been regarded as a good standard of forecasting; however, this was much below the desirable standard for the Airlift, where an error of one hour in forecasting the sudden onset of zero conditions may have caused a large number of aircraft to miss their approaches.

CONCLUSIONS

Of all the lessons learned and conclusions drawn by the Air Weather Service as a result of experience gained in "Operation Vittles", the most important and outstanding was simply the verification of a fact that has long been known in the weather service. Relying upon the present state of scientific development in the field of meteorology, the Air Weather Service is incapable of furnishing the exact weather forecasting required by such an operation. As previously stated, during the entire winter the operational minima at Airlift bases were 200' 1/2 mile except Tempelhof, where minima were 400' 1 mile. To meet the requirements fully, it was mandatory that the weather service be able to forecast with absolute accuracy within these minima over a period of at least three hours.

As mentioned above, it is not within the present

scope of meteorological science to accomplish this. It appears that advancements in instrument flying have outdistanced the science of meteorology and placed forecasting requirements on ceiling and visibility limits wherein weather people cannot forecast or even observe with sufficient accuracy. The only corrective measure for this forecasting deficiency is basic research, and that is being carried out to the limits of facilities available.

The deficiencies in present weather observing techniques, however, pose problems less difficult to solve. Speaking from a strictly operational viewpoint, the four necessary weather observations are ceiling, visibility, wind direction, and wind velocity. At the beginning of the Airlift these observations were taken in the approved weather service manner: i. e., ceiling from estimation or from a ceilometer placed somewhere near the weather station; visibility in a 360 degree circle from the instrument shelter; wind direction and velocity from an anemometer placed

on top of the operations building or tower.

As an example, due to the peculiar construction of Tempelhof Air Base and since present regulations would not allow the ceilometer to be installed on the field, it was placed a considerable distance behind the terminal building. The anemometers were installed on top of the terminal building and tower, some 100 feet above the ground. Because of the high terminal and neighboring buildings, a good visibility observation in all directions was impossible.

The error in this placement of instruments and physical construction is obvious. Weather elements were not observed where they mattered most at the approach zone and runway. The ceiling over a spot somewhere behind the terminal buildings may or may not be the ceiling over the approach end of the runway, the visibility taken from the instrument shelter may not be the visibility on the approach and on the runway, and the wind direction and velocity on top of the terminal building or tower, 100 feet above the field, may not be the same as that on the runway — particularly in the case of Tempelhof where the field is almost entirely surrounded by tall buildings.

Observational inaccuracies caused by this placement

of instruments and physical characteristics of the field were duplicated in one or more cases on each of the Airlift fields, and were responsible for some loss of confidence in the weather service by the pilots and operation personnel. Ceiling and visibility inaccuracies contributable to these faults were at least partially responsible for the record of almost 5,000 Airlift landings when official weather service observations placed the field below GCA minima, and accounted for a large measure of disregard for official weather service reports.

A situation even more dangerous than the loss of confidence resulted from the difference in wind directions and velocities between the official weather service reports taken at a considerable height above the ground and a considerable distance from the runway, and those winds existing on the runway itself. These wind reports became highly critical, particularly in the case of Tempelhof when continuous GCA approaches were being made. Throughout the final approach, the GCA controller was able to estimate the wind drift and incorporate the necessary correction in his instructions to the pilot. After holding this correction during the entire final run, neither the GCA controller nor the pilot was prepared for the

sudden 20 to 30 degree shift of wind at times encountered when the aircraft descended below the level of the surrounding buildings. This necessitated a rapid, last-minute correction, and even though the pilot was contact at the time, caused rough landings and offered a definite ground-loop hazard.

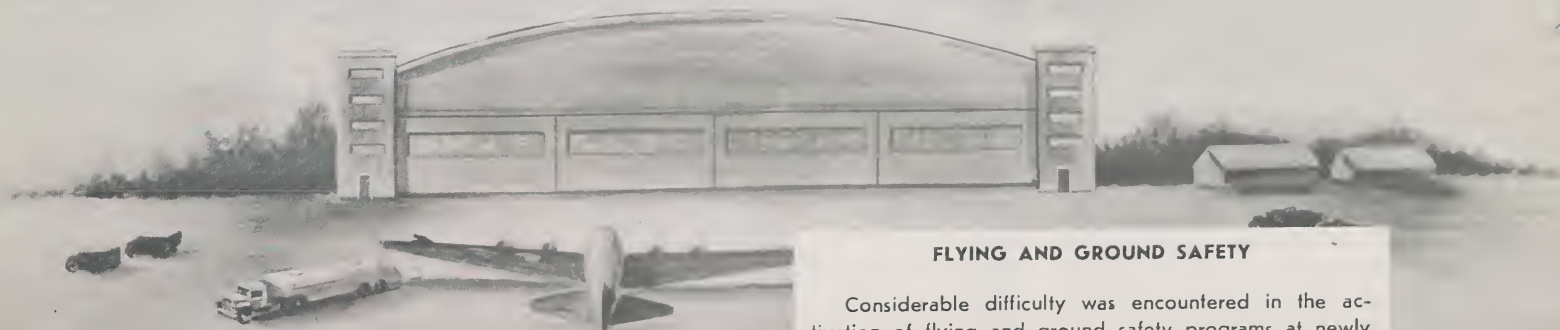
These observational inaccuracies, coupled with the scientific limitations of the forecasting service, created a lack of respect for the weather service in a number of operational people, and the "flying without regard to weather" attitude was subscribed to by quite a few.

In its efforts to improve its service, the Air Weather Service made every effort to correct the deficiencies herein mentioned. The forecasters' telephone conference net was instituted and proved to be of definite value. Visibility observations by an observer on the end of the runway were inaugurated and certainly proved to be a step in the right direction. An effort was made to have the ceilometer placed on the flying field near the runways, but this move was prevented by installation regulations. A similar effort to mount anemometers on the field near the runways was stopped by technical limitations involved in electrical losses between the anemometers and their recording instruments.

The apparent need for electronically-determined runway visibilities and approach ceilings has contributed to the development by weather people of the newly constructed transmissometer-ceilometer units, instruments which make and record continuous observations of the ceilings and visibility in the approach zone and on the runway. In the field of forecasting, new techniques have been developed and tried and will undoubtedly contribute toward improving forecasting accuracy, but no definite progress on the basic research problems can be claimed from this operation.

In the future, electronic recording instruments will undoubtedly improve the accuracy of weather observations, and perhaps some forecasting techniques learned in this operation will improve the forecasting. There still remains, however, a tremendous amount of fundamental research to be done before the science of meteorology will be capable of fully meeting aviation requirements.

AFTER WINTER'S HEAVIEST SNOW, C-54'S UNLOADED SIDE BY SIDE UNTIL SNOW REMOVAL CREWS CLEARED THE TEMPELHOF PARKING APRON.



FLYING AND GROUND SAFETY

Considerable difficulty was encountered in the activation of flying and ground safety programs at newly established Airlift bases and in the integration of safety activities of the Airlift units operating from permanent USAFE installations. With the arrival and assignment of additional safety personnel, accident control activities were accelerated, and aggressive flying and ground safety programs were initiated at each installation.

GROUND SAFETY

The ever-present major problem in ground safety was the freight-handling operation. Many aircraft were damaged by motor vehicles, trucks, and fork lifts engaged in loading or unloading of aircraft. Operators were unfamiliar with the procedures prescribed for operating their equipment in close proximity to aircraft. Operators of material handling equipment, moreover, were frequently inadequately trained; and the training of special purpose equipment operators, most of them German, proved a slow process.

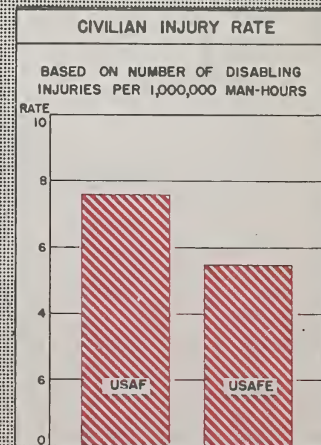
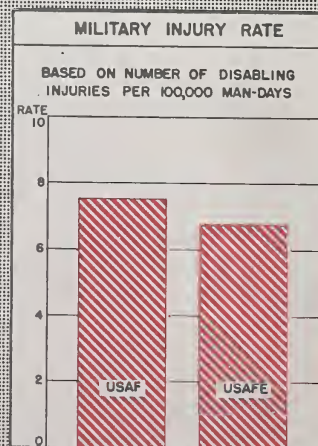
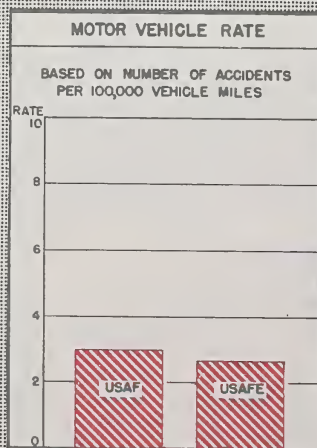
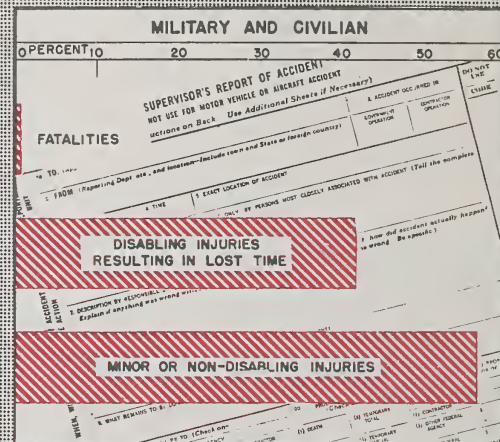
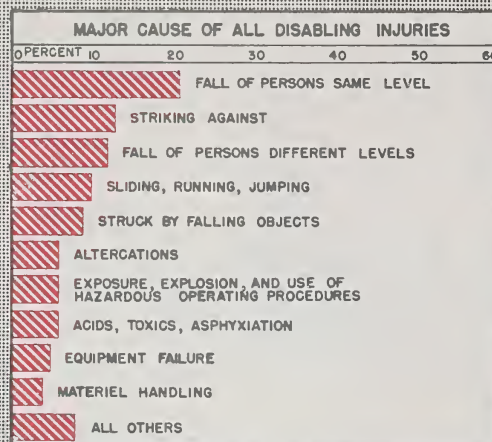
Several aircraft were extensively damaged during maintenance as a result of fires caused by igniting gasoline or gasoline fumes. The malpractice of using gasoline for cleaning purposes presented a constant problem to supervisory personnel, and repeated efforts were necessary to attain rigid enforcement of regulations and operating procedures covering the use of flammable liquids.

The adoption of appropriate corrective measures was often hindered by failure of personnel to report all ground accident damage to government property. In an effort to achieve more complete accident reporting this Headquarters devised and prescribed an aircraft ground accident form to be prepared on each aircraft accident not reportable on AF Form 14 and 14A, the flying safety reports.

To eliminate the damaging of aircraft by backing cargo trucks, the use of wooden chocks and the assistance of backing guides were prescribed as standard operating procedures. To reduce the problem of dusts caused by handling coal and flour, sprinkling and wetting down of loading ramps and areas was necessary. The control of motor vehicle traffic on airfields also proved a major problem, since the operators of these vehicles were frequently foreign nationals and ground force personnel not always familiar with the safety factors governing vehicular traffic on crowded airfields.

Constant instruction and training, coupled with supervisory vigilance, were necessary to obtain compliance with existing operating procedures and to keep the number of ground mishaps to a minimum. German safety engineers

USAFE GROUND ACCIDENTS DURING AIRLIFT



were utilized to supplement USAFE safety personnel. Their services were used in the instruction and training of German employees and in administering examinations of German motor vehicle and special purpose equipment operators.

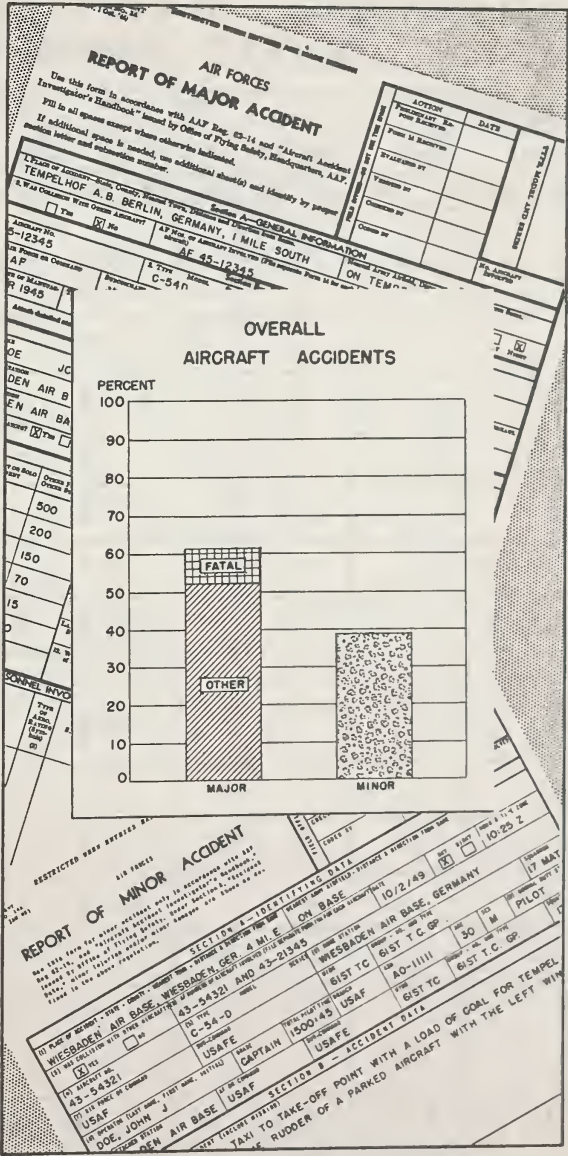
Available ground accident statistics do not indicate unusual or unsatisfactory trends; however, their compilation cannot be considered complete in view of the slow organization of the ground safety program during the early stages of the operation. The ground accident rates shown on the opposite page have been compiled from reports submitted by USAFE installations engaged in Airlift activities. In the compilation of these rates neither the accidents nor the military and civilian man-days of exposure of supporting Army personnel were included.

FLYING SAFETY

The exceptionally fine flying safety record of the Airlift was not achieved by, nor can it be attributed to the skill, ability, or contribution of any single man or any group of men. It was achieved through the cooperative efforts of many teams of skilled technicians. Yet in evaluating this safety record, attention must be focused on a particular group — the aircrews, the problems they faced, and the manner in which they accomplished their mission.

In order for the aircrews to attain maximum results demanded in this around-the-clock, all-weather type of operation with its tremendous accident potential, it was imperative that all precautions be taken to reduce operational hazards to a minimum. It has long been established that human error is by far the greatest cause factor involved in aircraft accidents, and it was constantly emphasized that every possible means of keeping this factor to a minimum must be utilized. This was accomplished through three general methods.

First, aircrews were provided with the best flying aid facilities that science could offer. Every modern means of radio, radar, and electronic navigational aid was installed on the routes flown. Each operational base was fully equipped with qualified GCA crews to guide aircraft in



for landings in bad weather. Weather service set up for Airlift operations was more elaborate and extensive than any forecasting service heretofore developed. Airfields were equipped, and in some instances rebuilt, for the sole purpose of facilitating the Airlift. Countless other devices and services were made available to the aircrews to provide them with maximum safety in the course of their duties.

Secondly, thorough supervisory control was maintained over the aircrews at all times. Frequent flight checks were conducted on all crew members to insure their ability to meet the high standards of proficiency demanded. Training of personnel was a continuing process. Due to the saturation of the air space on the routes flown, it was necessary to monitor all flights and in some cases actually to control them from ground air control centers. These centers worked in direct conjunction with the operational bases in allocating and coordinating flight schedules. Split-second timing, altitude spacing, and flight adjustments were mandatory to provide aircraft a safety space-margin.

Flying safety officers made frequent supervisory field trips to ascertain the adequacy of accident prevention programs and to assist safety personnel with unusual problems. Constant surveys and analyses were accomplished on accident data to determine whether cause factors were indicating a general accident trend due to faults in equipment, practices, or procedures. Close coordination with subordinate commands was maintained so that immediate action could be taken on any peculiar problem or difficulty encountered.

The third means of reducing human error was through safety education. Operational bases received all available safety publications for use in aircraft accident study classes. Following each accident, immediate TWX dissemination of cause factors was made in order that all bases might profit by the mistakes of others.

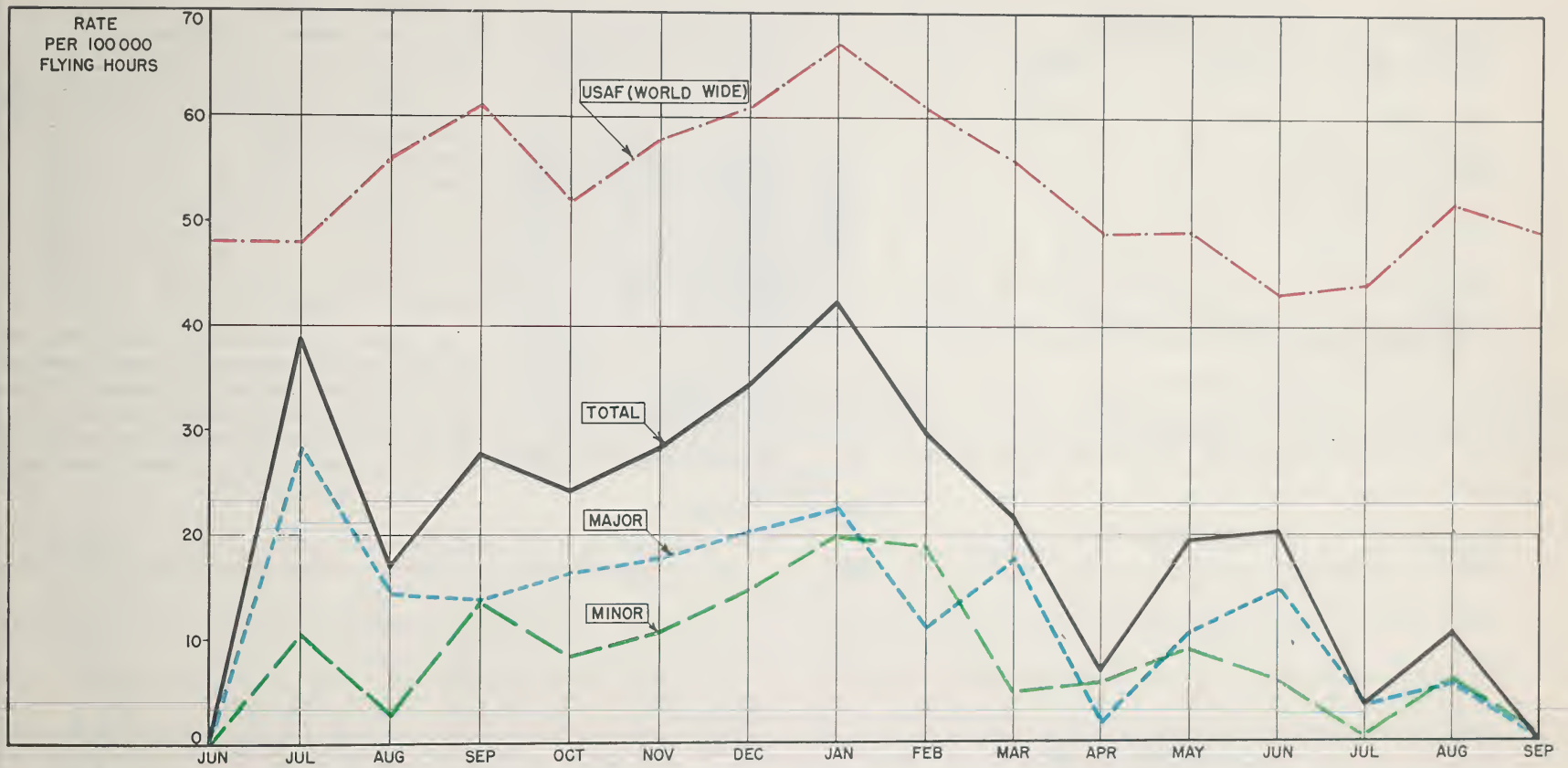
Throughout the entire period of the operation, the Airlift's safety record consistently bettered that of the overall Air Force in spite of all-weather and around-the-clock schedules. During the summer months of 1949 the Airlift shattered safety records for the amount of hours flown, bringing a full realization of safety efforts. Based

AIRCRAFT ACCIDENT SUMMARY

MONTH	TOTAL		BY TYPE AIRCRAFT								BY TYPE ACCIDENT										BY CAUSE FACTORS					
			C-47		C-54		R-5 D		C-82		TAKE OFF		IN FLIGHT		APPROACH & LANDING		TAXIING		OTHER		PERSONNEL ERROR		MATERIEL FAILURE		OTHER	
	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.	MAJ.	MIN.
JUNE 1948	0	0																								
JULY	8	3	6	1	2	2						2	1	3			2	2	1		7	2	1			1
AUGUST	5	1	3	1	2							1		2			1	1	1		4	1	1			
SEPTEMBER	6	6	5	3	1	3						1	1	2			2	5	1		2	5	3		1	1
OCTOBER	6	3			5	3			1		1		2		2	1	1	2			3	2	3	1		
NOVEMBER	5	3			3	3	2				1				3			3	1		4	3	1			
DECEMBER	7	5			5	3	1	2	1		1		4		1		1	5			4	5	3			
JANUARY 1949	9	8			9	6		2			1		1	1	6	3	1	3		1	7	5	1	1	1	2
FEBRUARY	4	7			3	6	1	1				1	1	4	3			2			3	3	1			4
MARCH	8	2			8	2							4		3			1	2		3	1	5			1
APRIL	1	3		1	1	2												1	3		1	3				
MAY	*6	5	1	1	4	3		1			1	1			5	1		3			4	4	2			1
JUNE	8	3			6	2	2			1	1			2	5	1	1		1		6		2	1		2
JULY	2	0	1		1								1		1						1		1			
AUGUST	1	1			1	1									1			1			1	1				
SEPTEMBER	0	0																								
TOTALS	76	50	16	7	51	36	6	6	2	1	6	2	17	9	37	6	11	32	5	1	50	35	24	3	2	12

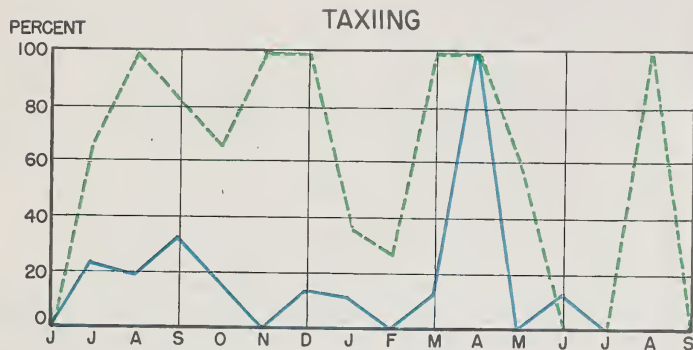
* INCLUDES 1 YC-97 MAJOR ACFT ACC

AIRLIFT ACCIDENT RATES



	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE		
USAF (WORLD WIDE)		48.0		48.0		56.0		61.0		52.0		58.0		61.0		67.0		61.0		56.0		49.0		49.0		43.0		44.0		52.0		49.0
TOTAL	0	0	11	38.8	6	16.9	12	27.8	9	24.4	8	28.3	12	34.4	17	42.3	11	29.7	10	21.6	4	6.8	11	19.3	11	20.4	2	3.3	2	10.4	0	0
MAJOR	0	0	8	28.2	5	14.1	6	13.9	6	16.3	5	17.7	7	20.1	9	22.4	4	10.8	8	17.3	1	1.7	6	10.5	8	14.8	2	3.3	1	5.2	0	0
MINOR	0	0	3	10.6	1	2.8	6	13.9	3	8.1	3	10.6	5	14.3	8	19.9	7	18.9	2	4.3	3	5.1	5	8.8	3	5.6	0	0	1	5.2	0	0
FATALITY	0	0	5	17.6	4	11.4	0	0	4	10.9	0	0	4	11.5	10	24.9	0	0	1	2.2	0	0	0	0	0	0	3	4.9	0	0	0	0

AIRCRAFT ACCIDENTS BY



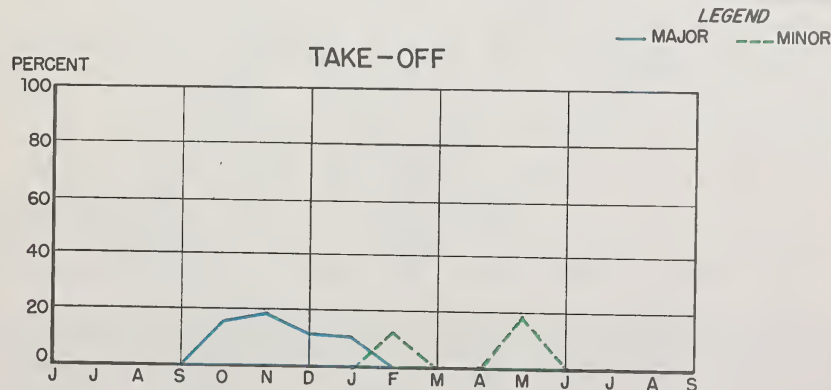
MAJOR	0	2	1	2	1	0	1	1	0	1	1	0	1	0	0	0
MINOR	0	2	1	5	2	3	5	3	2	2	3	3	0	0	1	0



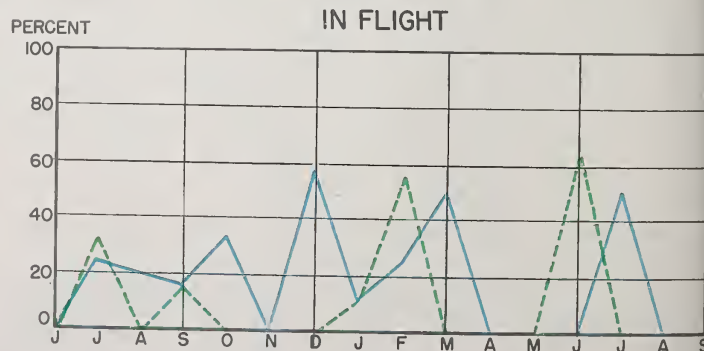
on the total of 586,901 hours flown during the operation the accident breakdown is as follows:

TYPE	NUMBER	RATE PER 100,000 FLYING HOURS
Fatal Accidents	12	2.045
Fatalities	31	5.282
Wrecked Aircraft	22	3.749
Major Accidents	70	11.927
Minor Accidents	56	9.542
Total Accidents	126	21.469

An analysis of these accidents reveals nothing unusual that might be anticipated for the type of operation involved. During the early period of the Airlift the ratio of night accidents to day accidents was seven to four; however, this ratio balanced fairly evenly during the latter half. The number of accidents occurring under instrument



MAJOR	0	0	0	0	1	1	1	1	0	0	0	1	1	0	0	0
MINOR	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0



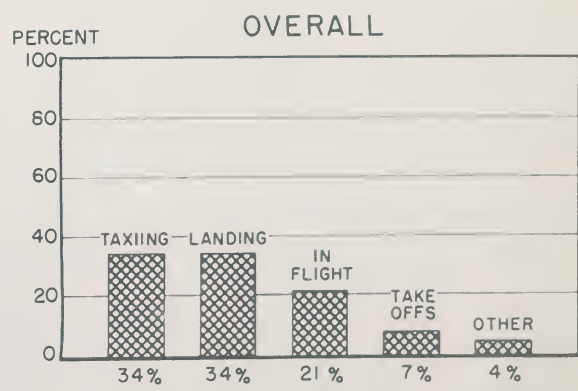
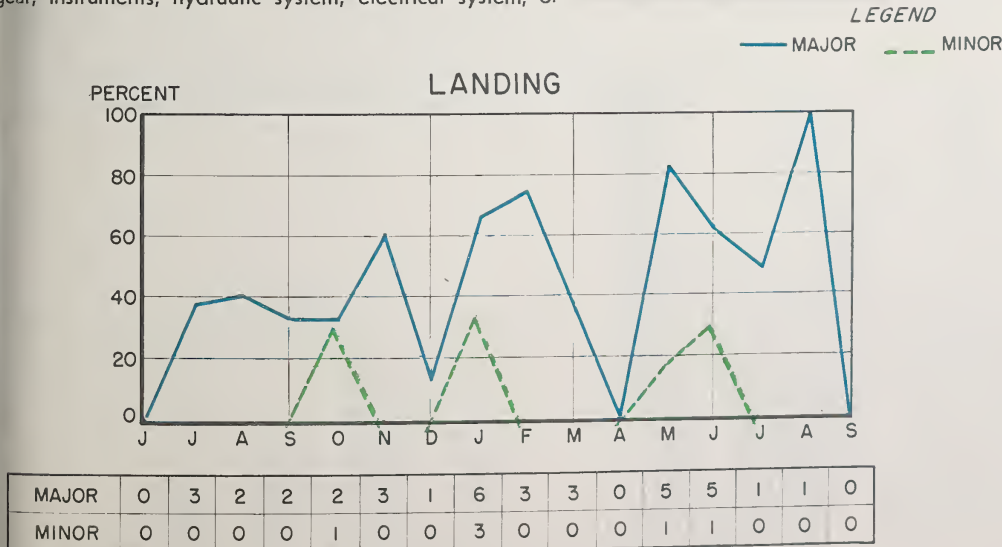
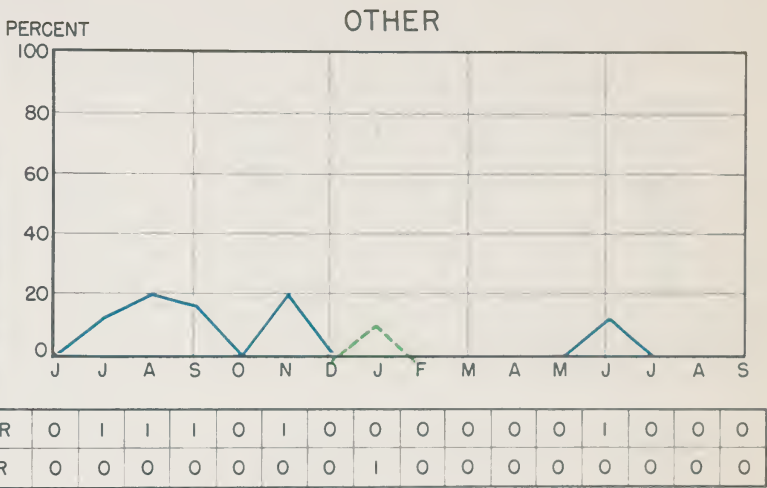
MAJOR	0	2	1	1	2	0	4	1	1	4	0	0	0	1	0	0
MINOR	0	1	0	1	0	0	0	1	4	0	0	0	2	0	0	0

PHASE OF FLIGHT

flight conditions was reduced approximately 83 percent during the second half of the operation.

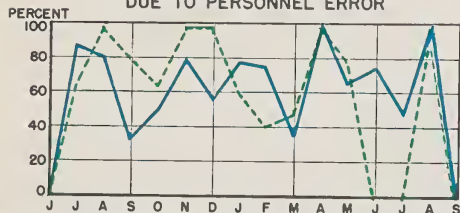
As to types of accidents, there were two major categories. Most prevalent were taxi accidents, accounting for more than 34 percent of all accidents. Landing accidents accounted for approximately 26 percent of the accidents. Other categories included collision with ground, take-offs, fire in air, fire on ground, collision with other objects, forced landings, abandoned plane, and collision in flight. Cause factors of these accidents fall into four major categories: pilot error, other personnel error, materiel failure, and miscellaneous. The latter includes such factors as weather, navigation, lack of fuel, airports and facilities, and less-than-full crew.

The majority of all accidents involved more than one cause factor. In approximately two-thirds of the accidents that occurred, pilot error was charged as a cause factor. Material failure of the power plant, air frame, landing gear, instruments, hydraulic system, electrical system, or



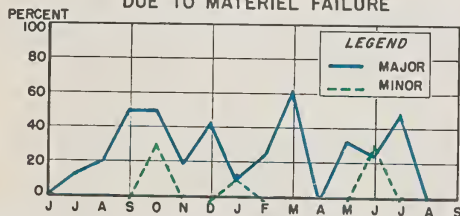
AIRCRAFT ACCIDENTS BY CAUSE FACTORS

DUE TO PERSONNEL ERROR



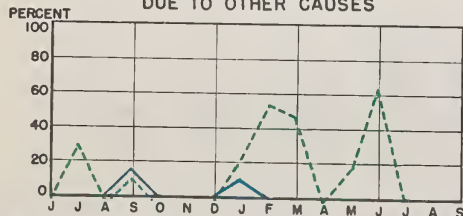
MAJOR	0	7	4	2	3	4	4	7	3	3	1	4	6	1	1	0
MINOR	0	2	1	5	2	3	5	3	1	3	4	0	0	0	1	0

DUE TO MATERIEL FAILURE



MAJOR	0	1	1	3	3	1	3	1	1	5	0	2	2	1	0	0
MINOR	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0

DUE TO OTHER CAUSES



MAJOR	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
MINOR	0	1	0	1	0	0	0	2	4	1	0	1	2	0	0	0

radio equipment was charged in approximately five-twelfths of the accidents that occurred. Error on the part of other personnel was charged in approximately one-fourth of the accidents. Airports and facilities were considered a factor in one-third of all the accidents, and weather in approximately one-fourth.

SUMMARY

No aspects of the Airlift were of greater significance than the constant effort directed toward safety. Records established were not easily achieved. They required co-operative effort on the part of all personnel throughout all echelons of command. Safety programs were based on the principle that **needless waste of manpower and materiel can and must be eliminated**. Policies regarded as imperative included complete standardization of operating procedures and techniques, a comprehensive system of supervisory checks, periodic proficiency checks of aircrew personnel regardless of the initial proficiency level, continuous training programs, and complete operational control both in the air and on the ground.



RECOMMENDATIONS

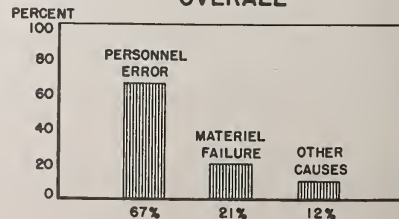
Flying safety officers must be members of the commander's staff. The flying safety program is defeated in direct proportion to the number of intermediate officers through whom the flying safety officer must report.

T/O&E's should be modified to include flying safety officers, authorizing not less than one field grade officer, one non-commissioned officer, MOS 502 or 405, and one clerk-typist at the wing level. Similarly, in order to achieve satisfactory ground accident prevention results, adequate and qualified ground safety personnel must be made available and included in the organization, preferably through allocations in pertinent Tables of Organization. A full-time ground safety officer and ground safety technician, MOS 486, at headquarters level and at each operating installation are considered the minimum personnel requirements, when supplemented by adequate clerical assistance.

Adequate training must be given to operators of all types of motor vehicles, special purpose, and material handling equipment. Emphasis must be placed on safe operation near aircraft and on hazards prevalent on an air base.

Competent and adequate supervision of all loading and unloading operations is imperative. Rigid enforcement of safe operating practices and procedures should be maintained at all times.

OVERALL



INTELLIGENCE



The Airlift did not initially establish any new intelligence requirements, since intelligence agencies were in operation at each USAFE base used by Airlift units, and the Airlift itself had the primary mission of delivering tonnage to Berlin. Rather than creating new requirements, the increased tempo of operations intensified already existing ones. As a consequence this Headquarters did not include a specific intelligence mission in its letter of instructions to the Airlift commander.

The lack of a specific intelligence requirement in the letter of instructions did not presuppose, however, the complete absence of an intelligence mission. As a USAFE unit, all intelligence regulations, letters, and other directives applicable within USAFE applied to the 1st ALTF. The Airlift commander had all the intelligence responsibilities normal to a command.



FUNCTIONS

With the continuation of the Airlift and its subsequent expansion into an operation which included American, British, and French elements, certain new problems not originally encountered were posed. These problems concerned the briefing of aircrew personnel on the corridor situation; the institution of measures for the prevention of compromise of classified information and equipment and the prevention and detection of sabotage, espionage, and subversion at the British and French bases; and finally the manning of Airlift units with sufficient intelligence personnel to accomplish the increased workload.

The first problem arose from the fact that the narrow corridors running to Berlin from the American and British Zones of Occupation were restricted flying areas and any interference with Airlift flights within the corridors created safety hazards. Although the air corridor agreements did not anticipate the volume of traffic occasioned by the airlift of supplies into Berlin, they did provide the basis for a safe operation if all the signatories abided by the agreements. Violations of or exceptions to the rules on the part of any one nation would have had a serious effect on the success of the Airlift.

Soon after the Airlift began, pilots reported that they had encountered Soviet formation flying within the corridors, buzzing, and other nuisance tactics. To obviate the effects of these tactics intelligence officers were instructed to inaugurate a system of daily pilot briefings and debriefings. This system provided the means of notifying all Airlift pilots of the kind of violation they might expect and of preparing them to take the necessary countermeasures. Additionally, the daily briefing brought to the pilots' attention those flights other than Airlift which were posted in the Berlin Air Safety Center. By daily reports to this Headquarters, it was possible to make known violations the basis for complaint against the Soviets.

Measures necessary to prevent compromise of classified information and equipment, and prevention and detection of sabotage, espionage, and subversion at U. S. installations did not present an unusual problem since they had been under USAFE control prior to the Airlift. The

expansion of the American participation in the Airlift to the use of air bases in the British Zone of Occupation and in the British and French Sectors of Berlin did pose new problems, for it placed American commanders in a position in which they did not have complete responsibility for these intelligence functions at the installations they occupied. The local British or French commander was the proprietor while the American commander was the tenant. In order to continue the prerogative of a commander to insure that necessary measures were taken to impede and counteract any effort to subvert his personnel or to sabotage his equipment, arrangements were completed whereby the British and French commanders retained area responsibility while the American commander was responsible for local protection of U. S. personnel and equipment.

In the British Zone of Occupation, where large numbers of foreign nationals were employed, British hiring methods were accepted, but the American element retained the right to control their use. In those instances where foreign personnel were considered a threat to the security of U. S. classified information and equipment, the U. S. Air Force instituted action for their removal and the British accomplished their dismissal.

The use of foreign nationals at Airlift installations presented a favorable opportunity to any faction interested in undermining the Airlift effort by means of disaffection or sabotage. While no estimate exists as to the extent to which foreign nationals attempted to create disaffection or to sabotage, it is known that disaffection never became a problem and that sabotage efforts were singularly unsuccessful. Twenty-seven cases of suspected sabotage were reported, but only four cases could be proved.

PERSONNEL

The requirements for holding daily briefings and maintaining security combined to cause a shortage of trained intelligence personnel. A survey of the intelligence personnel requirements at all Airlift bases indicated that a total augmentation of 24 officers and 31 airmen was

necessary to carry out the function.

These additional requirements represented the minimum necessary to carry on a 24-hour-a-day type of operation. While they could not be met by the assignment of trained intelligence personnel, every effort was made to procure and assign experienced personnel. In many instances individual commanders in the field placed personnel in these positions irrespective of T/O&E and augmentation authorizations, for they realized the necessity of providing intelligence information to their crews in the air and of providing counterintelligence coverage on the ground.

CONCLUSIONS

While the Airlift represented a unique situation because of the specific circumstances under which it arose and was carried out, the experience gained does permit certain conclusions to be drawn which may be of value elsewhere.

In a mass transport operation, a specific intelligence mission is not necessarily required provided that normal intelligence functions are included as a part of command. If the necessity arises, specific intelligence missions may be assigned without interference with the primary mission of transporting personnel and supplies.

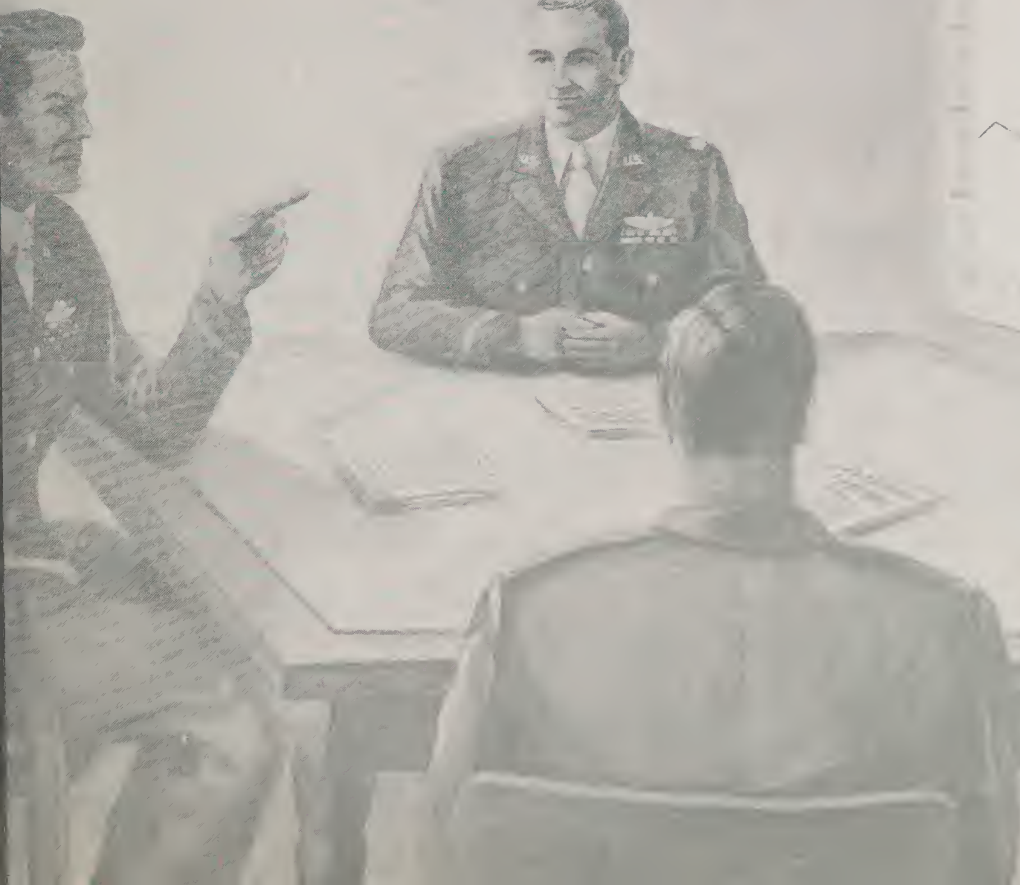
If the operation requires flying through narrow corridors in the face of nuisance tactics, daily briefings of all aircrew personnel will afford them sufficient information to enable them to carry out their flights with safety.

In the event that the U. S. Forces operate from allied bases, protection from espionage, sabotage, and other subversive activities can be obtained by assigning a specific responsibility to each element on the base.

The rules governing the allocation of additional personnel to meet new problems must remain sufficiently elastic to enable commanders to meet changing intelligence requirements; otherwise the commander is forced to improvise in critical areas.

The Airlift proved that existing Air Force intelligence principles and procedures are sufficiently flexible to insure success in such a restricted type of operation.

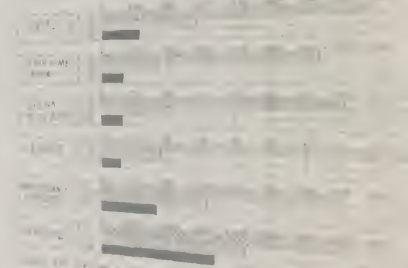
PLANS



TONNAGE STUDY



COMPARISON OF AIRCRAFT POTENTIAL



The Berlin Airlift came into being as an unplanned operation. The action of closing the surface routes to the city of Berlin and the need for immediate establishment of a flow of supplies by air precluded formal preplanning for the operation.

The Airlift was envisioned at first as a short-term expediency. Planning was therefore conducted principally by the operating agencies during the initial stages. As the scope and probable duration of the operation became apparent, planning was formalized. With the establishment of Headquarters 1st ALTF, that agency assumed the responsibility for detailed operational planning under the general guidance of Headquarters USAF. Long-range planning and top-level coordination with British and French forces and with other interested U. S. agencies remained under direct control of Headquarters USAF.



THE C-97A PICTURED DURING ONE OF HER TEST AIRLIFT FLIGHTS.

COORDINATION

The status of the Airlift as a combined operation necessitated complete and rapid coordination at all echelons. The Army was responsible for transport of cargo from "railhead to airhead"; the Navy participated in the Lift with two squadrons of transport aircraft, as well as ferrying cargo across the Atlantic; depot maintenance became the responsibility of the 3rd Air Division; OMGUS computed the type and amount of supplies required for the city of Berlin; and the British participated as full partners in the operation.

PLANNING STAFF

The rapid expansion of the Airlift and the lack of precedent for the operation necessitated individual planning by all staff agencies and at all echelons as problems peculiar to their functions arose.

Formal long-range planning was normally conducted jointly by the plans sections of the various Directorates of Headquarters USAF and Headquarters 1st ALTF in close coordination with EUCOM and other interested agencies.

Combined planning was simplified by the inclusion of both USAF and RAF officers on the planning staff of Headquarters CALTF.

CONCLUSIONS

In an ideal situation in which the problem could be foreseen, advance planning by a central planning staff

composed of specialists representing all participating services would unquestionably have aided in performance of the mission.

Prior warning and consequent advance planning by qualified specialists would have facilitated solution of the numerous problems which arose in the early stages of the operation.

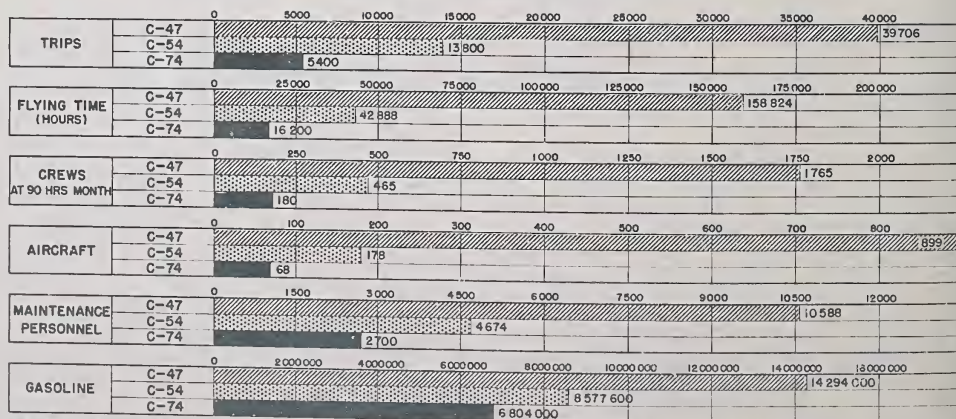
Rapid and close coordination between all echelons is essential to the accomplishment of the mission.

RECOMMENDATIONS

A combined planning staff in which all participating agencies are represented would form the most efficient planning agency.

A centralized competent plans section is a vital necessity. The commander of a special operation should establish his plans section at the earliest possible time.

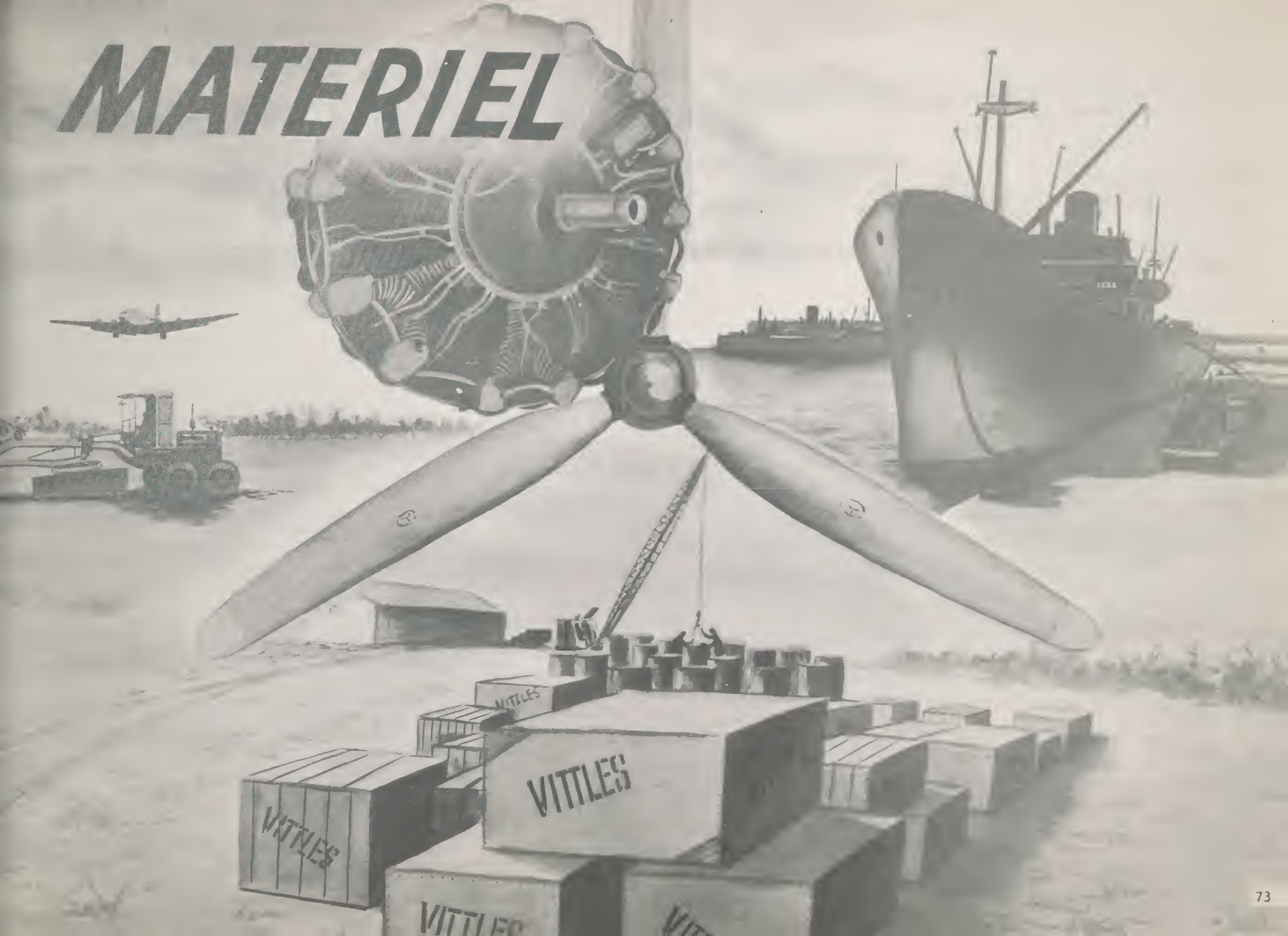
COMPARISON OF AIRCRAFT POTENTIAL



FACTORS: 3.4 TONS FOR 4 HR ROUNDTRIP BY C-47
9.7 TONS FOR 3.3 HR ROUNDTRIP BY C-54
25 TONS FOR 3 HR ROUNDTRIP BY C-74

NOTES: THE ABOVE CHART SHOWS A COMPARISON OF OPERATING POTENTIAL FOR 3 TYPES OF AIRCRAFT. IT IS BASED UPON FLYING 4500 TONS DAILY FOR A 30 DAY PERIOD.

MATERIEL



INTRODUCTION

The initial action of the USAFE Deputy Chief of Staff for Materiel was to make transport aircraft available for the operation. At that time the C-47 was the only cargo-type aircraft available for immediate use.

Meanwhile, action was initiated to obtain C-54's. On 1 July 1948 the first C-54 type aircraft to supplement the Airlift C-47's arrived at Rhein/Main Air Base. By 1 October the complete Airlift fleet of C-47's had been replaced by C-54's.

A comparatively new aircraft to this command, the C-54 created numerous problems in its support. Parts for this aircraft were foreign to supply personnel, and maintenance personnel were for the most part unfamiliar with it. These problems were intensified by the fact that the C-54 was designed for long-range flights with a minimum of take-offs and landings, while Airlift operation entailed an abnormally high number of loaded take-offs and landings for the small amount of flying time involved. Consequently, appropriate consumption data and maintenance experience were not available.

The construction of new runways and taxi strips, plus the rebuilding of old runways and taxi strips that had broken down under heavy loads, was a further Materiel responsibility.

These are just a few of the many problems that had to be met and dealt with. Action taken in meeting these Materiel responsibilities will be related in the following pages.

BLACK • ROLF
• UNSCHEDULED MAINT
• BURTONWOOD
• ROUTINE INSPECTIONS
• BASE SHOPS

AIRCRAFT STATUS AS OF NOV
ALLOCATED
ASSIGNED
% IN COMMISSION
TOTAL ERDING
TOTAL BURTONWOOD
DE-ICE OBE
% SCHEDULED TO Z.1
TOTAL IN BURTONWOOD
AT ANY TIME 12

NOV

TOTAL
1320
377
742
415
TOTAL

SUPPLY



MISSION

The rapidity with which the Airlift expanded imposed unforeseen supply requirements. To prevent supply channels from breaking down, and to insure a minimum of delays in delivery of supply and materials for the Airlift operation, all branches of the Supply Division went on a 24-hour schedule at the start of the Airlift and continued so throughout the entire operation.

During this period, a Theater Equipage Program was underway whereby all T/O&E units, especially tactical units, were being brought up to 100 percent strength in their authorized equipment. Required implementation action had been taken to insure equipment for the various T/O&E units affected, and considerable progress had been made when it was discovered that the immediate mission of Airlift units, particularly troop carrier units, was being impaired by efforts expended in obtaining equipment not primarily required for Airlift support. Accordingly, USAFE requested a waiver of the T/O&E equipage requirements during the Airlift. Headquarters USAF's favorable consideration of this request greatly aided the effectiveness of the Airlift operations, in that the emphasis could be concentrated on shortages of those items required for the successful completion of the Airlift mission, the goal of 100 percent equipage thereby becoming secondary in importance for the time being.

Concurrent with the above and nearing completion was

a Theater Disposal Program through which all World War II equipment in excess of current theater needs was being disposed of by sale through OFLC (Office of Foreign Liquidation Commission) and other governmental agencies or by return shipment to the ZI.

Vast quantities were packaged and stored at Erding Air Base awaiting shipment to the ZI. This equipment, plus that recalled from governmental disposal agencies, was utilized as the supply source for an internal theater supply system.

Here, another problem was encountered. The unpacking, sorting, and reshelving of this equipment had to be accomplished at the same time that issues were being made in support of the Airlift. However, after a period of time this problem was solved with the assignment of additional personnel who were given on-the-job training.

As a matter of temporary expediency, units at Fassberg and Celle during the initial stages of the operation were supplied from the Bremerhaven Port of Embarkation for all items of technical service equipment and supplies. While this plan continued in force during the entire operation, procurement of large quantities of technical service items was greatly expedited by an agreement between EUCOM and USAFE whereby requisitions direct to the appropriate EUCOM depots were authorized. In effect there was a direct supply channel from the respective EUCOM depots to the using organizations.

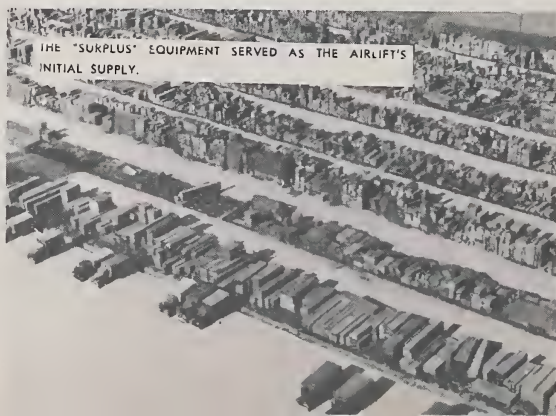
GENERAL

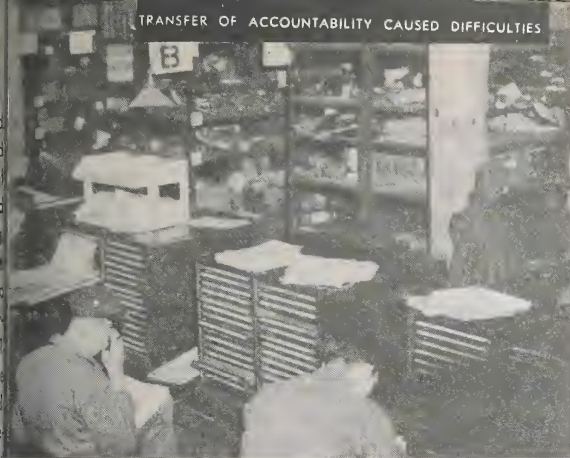
Simultaneous arrival of operating units, personnel, and supplies caused a great deal of confusion at Fassberg and Celle and made necessary the temporary stockpiling of supplies in hangers. The early tempo of the operation did not permit proper warehousing, binning, identifying, sorting, and inventorying of items prior to issue. Spares arriving at the various air bases had to be issued to maintenance units without proper paper work, since aircraft began operating almost immediately upon arrival. When shipping tickets were processed, it was impossible to make a physical count of actual property received. Processing of vouchers had to be made a month after receipt of issue. Arrival of many items of supplies without accompanying shipping tickets and subsequent issue of these supplies before an accounting system had been established resulted in the need for a large inventory section. However, once the records were adjusted no problems were encountered in keeping them up to date.

Considerable difficulty was caused during the early portion of the Lift by the overlapping command jurisdiction of the C-54's shuttling between Westover AB, Massachusetts, and Rhein/Main. While on the westbound trip passengers were carried, on the east-bound leg none were authorized. Time after time, the liferafts and other overwater equipment were removed at Westover, and installation of similar equipment was required at Rhein/Main before the next trip. This drain on the command's equipment was eliminated through discussion with Headquarters MATS, and the surplus equipment at Westover was returned to Rhein/Main.

Coupled with the changes in equipment status of the C-54's was the lack of uniformity in the maintenance of Aircraft Checkers Reports, AF Forms 263. A partial solution was reached by establishing a unit at Rhein/Main with responsibility for the installation and removal of overwater equipment and parachutes and for making corresponding entries on AF Forms 263.

Tool kits brought over by airmen posed another problem. As destinations were unknown at the station of departure, a plan was devised at Headquarters AMC where-





by the shipping documents would be forwarded to the Headquarters 1st ALTF with the consignee space left blank. That Headquarters then had the responsibility of routing the forms to the appropriate station accountable officer.

Difficulties similar to those cited in preceding paragraphs were encountered in connection with flying clothing and equipment brought by individuals. In numerous instances it was necessary to return the shipping tickets to the consignor because the individual had completed his and returned to the ZI prior to receipt of those documents.

During the mass exodus of airmen at the cessation of "Vittles", the matter of transfer of accountability for organizational-type clothing and equipment taken with the individuals caused difficulties. Although long before the termination of the operation a simplified procedure was recommended to AMC for approval, no decision was received prior to the phase-out. Therefore, the transfer of accountability was accomplished in accordance with the standard procedure prescribed for transfer of memorandum-receipt properly. Since in no instance was the destination of the airmen known, it was necessary to prepare individual shipping documents and route them to the ZI Ports of Entry for transmittal to the airmen's destination. This was accomplished during the inactivation period by supply personnel.

Shortly after the inception of the Airlift, Unit Property

Records and Equipment Lists (UPREL) were authorized. Headquarters USAFE requested first priority in the preparation of the form for the property books of the troop carrier wings. Since the original books had not been received before cessation of Airlift operations, only in isolated cases was it possible to complete book entries; but in these cases the use of the UPREL proved invaluable in the transfer of the organizations to the ZI.

Stock control levels had to be established from issue data. The first group came from Fairfield Air Base and brought hastily prepared tables, but these were not of much value as they were based on experience gained from flights averaging 12 to 16 hours' duration with light loads. The large number of landings, especially in the case of the Fassberg- and Celle-based aircraft, outmoded all previous data, particularly as to brakes, struts, and other parts of the landing gear. Adequate levels were finally determined and established. Pending establishment of the proper levels, the ultra-rapid service rendered by stateside depots was invaluable and accounted in great part for the low AOCF (Aircraft out of Commission for Parts) rate evidenced throughout the operation.

SUPPLY ORGANIZATION

AUTOMOTIVE SUPPLY

It was apparent that additional vehicles would be required in direct proportion to the scale of the Airlift itself.

The initial demand for general purpose and special purpose vehicles and material-handling equipment was satisfied by transferring items from other USAFE bases to Wiesbaden and Rhein/Main Air Bases. As the Airlift expanded, it became necessary to draw on the EUCOM Ordnance Division for major items on a temporary loan basis.

With the opening of Fassberg and Celle, the temporary loan arrangement with EUCOM was extended, and shipments of vehicles were begun well in advance of the activation dates of the bases. A total of 958 Ordnance general purpose vehicles were loaned for the Lift, and frequent replacements of some types resulted in more



than double this number of vehicles being issued from EUCOM Ordnance stocks.

During the fall of 1948, the rebuild and rehabilitation of AF special purpose vehicles was stepped up by Erding Air Base in its shops at Munich, Bruck, Weinheim, and Ulm in order to meet the rapidly increasing demand for Cletracs, refueling units, wreckers, and busses. Over 1,000 AF special purpose vehicles, including 206 fuel servicing trailers, came off the production lines at these four shops during the period 1 July 1948 to 1 July 1949.

With the arrival of the 317th Troop Carrier Wing and 313th Troop Carrier Group and the opening of Celle and Fassberg RAF Stations, a period of unprecedented vehicle utilization began. All four Airlift bases operated around the clock, with many vehicles in service 24 hours daily. The consequent lack of vehicle maintenance made replacement rates high.

The support of the Airlift furnished by EUCOM Ordnance and Quartermaster Divisions was superb. Demands for all types of Ordnance general purpose vehicles were promptly met. Shipments of spares and tools were expedited, and a resupply system was set up to handle the heavy demand for "VDP" (Vehicles Deadlined for Parts) parts on an emergency basis. Vehicles which had been reduced to a state of unserviceability by constant use were removed from bases, and replacements were furnished from Ordnance rebuild shops.

Forklifts and tugs in the hands of Airlift units were

given heavy maintenance in depot shops on an exchange basis. Supply action on parts for field maintenance of material handling equipment (MHE) was prompt and complete. At no time was there a critical shortage of any MHE spares. Thirty Planeloaders received for the Airlift from AMC were processed, stored, and issued for USAFE by the Giessen Depot.

Stocks of Air Force Special Purpose (AFSP) vehicles and spares for their maintenance proved inadequate, and it became necessary to call on Headquarters AMC for shipments of refueling units, Planeloaders, crashfire trucks, and large numbers of replacement parts. Since stocks of many spares had been depleted in the ZI and no procurement action had been contemplated prior to the Airlift demand, supply action was at first very slow, and vehicle deadline rates were high. However, with the arrival of new major items from the ZI during the winter and the increased flow of spares, the critical shortage of AFSP vehicles was relieved. By March 1949 no difficulties were being experienced in supplying any type of vehicle.

At the phase-out of the operation, vehicles on loan from the Army were debited against the USAFE credits set up in Ordnance depots upon the allocation of Army-Air Force stocks and were shipped to Erding Air Base for inspection and disposition.

ENGINEER SUPPLY

Increased traffic necessitated construction of new runways at Tempelhof and Tegel Air Base. Since Engineer Heavy Mechanical Equipment could be moved into the Berlin area only by air, a crew of mechanics was stationed at Rhein/Main Air Base to disassemble the equipment and prepare it for air shipment. C-82's and a C-74 were used in movement of this equipment, which weighed approximately 400 tons. In addition to the equipment for construction, Engineer supplies had to be airlifted, among them approximately 3,500 tons of pierced steel planking (PSP) and clips, 1,000 tons of asphalt, and about 500 tons of assorted Engineer supplies.

The responsibility for repairs and utilities supplies at Fassberg and Celle RAF Stations was a British function. However, the British and U. S. Forces have different views as to repairs and utilities requirements and standards. The shipment of numerous carloads of Engineer supplies furnished by the U. S. Air Forces was necessary to meet the minimum U. S. requirements at those RAF stations.

Two steam-cleaning units for aircraft wash racks were required at Celle and Fassberg. U.S. personnel constructed them from available boilers transferred from Army stocks at Hanau Engineer Base Depot. The improvised steam-cleaning units worked out very well.

Construction had to be stepped up at Rhein/Main and Wiesbaden Air Bases to handle in-shipment of supplies to be flown to Berlin and to provide additional house-keeping facilities for Airlift personnel. This new construction required many tons of Engineer construction materials, which were procured locally or requested from Hanau Engineer Base Depot. To expedite the receipt of supplies from the depot, a liaison team was established between the Engineer Supply Division, Headquarters USAFE, the 555th Engineer Regiment at Rhein/Main, and the Hanau Engineer Base Depot. This team was instrumental in maintaining a continual flow of the supplies required for increased construction.

During the Lift, Rhein/Main Air Base received approximately 25 carloads of Engineer supplies daily. At

times this amount increased to as many as 200 cars of bulk Engineer items in a day.

During the winter months, snow and ice on runways became a hazard and threat to the continued operation of the Airlift; however, sufficient anticipation of conditions allowed supply agencies to requisition and receive from the ZI 36 tractors and sweepers and 20 snow plows. This equipment was continually in operation keeping the runways and taxiways open for traffic. In late January heavy fog and mist and the persistent freezing weather caused the formation of ice on runways and taxiways. To meet this problem, sand spreaders developed by EUCOM Engineers were requisitioned by all stations and put into immediate use.

From the Engineer supply standpoint, the Airlift became a routine operation following the winter. Engineer supply personnel encountered no difficulties in obtaining requirements. A procedure adopted on 1 April 1949 authorizing local procurement for the purchase of Engineer supplies was instrumental in saving both time and money.

Upon the phase-out of the operation, disposition of excesses was made on the spot; this was a routine operation that was performed smoothly and efficiently within the time allocated.



78 TESTING THE FASSBERG "BIRD BATH". CAPACITY: EIGHT C-54'S EVERY 24 HOURS.



THIS TEGEL CONSTRUCTION EQUIPMENT WAS AIRLIFTED TO BERLIN.

AIR SUPPLY

All USAFE C-47 aircraft were pooled at Rhein/Main and Wiesbaden Air Bases and utilized during the first three Airlift months. Spare parts and components were available in the command in sufficient quantities to support them adequately. Although no major supply problems were encountered in their support, there was a tremendous overnight increase in supply operations.

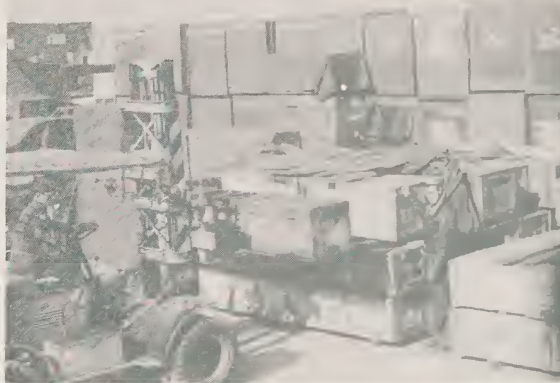
During this initial period, the equipment and facilities available within USAFE were being surveyed to determine their adequacy to meet the tonnage target already established as essential to a minimum-subsistence Berlin economy. Requirements were established at 225 C-54 aircraft. The first of the C-54-type aircraft arrived in July 1948 to assist and later to replace the unsuitable C-47-type aircraft. The change-over was completed three months later.

All planes sent to the command brought with them the C-54 Table II supplies necessary to support normal operations for a period of 30 days. The C-54's were designed for passenger purposes and for use on long runs. Consequently, the use of C-54's on short hauls for sustained operations increased the requirement for maintenance supplies. Under the conditions imposed by the operation, aircraft hardly obtained cruising altitude when they had to be prepared for landing; the frequency of this cycle imposed severe loads on the engines.

It was found that aircraft flying an around-the-clock operation required replacement of numerous parts which under operating conditions for which the aircraft had been designed had seldom, if ever, required replacement. These parts were not available in Germany, nor were they available in sufficient quantity in the ZI.

The usual Airlift loads — coal, flour, and salt — were the type which, regardless of how packaged, emanated a very fine dust that spread throughout the interior of the aircraft and over its working parts. This dust reacted as an abrasive on some parts and as a corrosive agent on others, requiring unforeseen replacements of electronic equipment, control cables, and electrical wiring which further aggravated the supply problem.

RHEIN/MAIN BECAME A C-54 PECULIAR SPECIALIZED DEPOT ACTIVITY.



In the meantime, top USAF supply personnel had arrived to confer with USAFE personnel and work out the logistics to solve the supply problems. At this conference plans were laid that formed the foundation of a supply system which enabled the C-54 aircraft to keep an ever-increasing tonnage of food and supplies pouring into Berlin.

Supply functions at Rhein/Main Air Base were converted to those of a C-54 Peculiar Specialized Depot Activity. Rhein/Main assumed responsibility for central requisitioning, warehousing, and distribution of all components and parts peculiar to the C-54 aircraft. Erding AB retained its depot responsibilities for all common Air Force supplies.

To combat the ever-increasing shortage of parts and supplies, Rhein/Main established a system of daily cable requisitions to Headquarters AMC. That Headquarters acted promptly on those messages to expedite air shipment of available items and to obtain items not in stock by accelerating contract delivery or initiating emergency procurement action. The requisitions initially covered only C-54 peculiar items, but were later expanded to include common items. Quantities requested on items peculiar to C-54 aircraft represented an estimated 60 days' supply.

Although cable requisitions were given priority over all others, immediate shipment was not always possible. This fact further weakened the supply support so essential to the operation. Limited funds were authorized to purchase locally from stocks available at the Brussels branch of the Douglas Aircraft Corporation. This source of supply proved of benefit in certain individual cases where an aircraft could be put back in commission through the purchase of one or two items not immediately obtainable through USAF stocks.

Building USAFE stockpile for C-54 parts was the next major supply problem. To transport the parts without delay, a special ocean shipping service, designated "MARINEX," was set up. Eventually, stocks began to accumulate under this plan, and the utilization of costly air transportation was reduced to emergency items only.

Initially, consumption data on C-54 aircraft items was not available in the command. Quantities requisitioned on priority cable requisitions and routine requests were continually being adjusted to conform to the consumption and requirement data collected daily. The magnitude and nature of the operation made the important phase of determining requirements and establishing stock levels a most difficult task. The gradual increase in the number of C-54 aircraft assigned to the Lift, from the first 50 in July 1948 to the peak of approximately 230 in December 1948, necessitated continuous revision of stock levels.

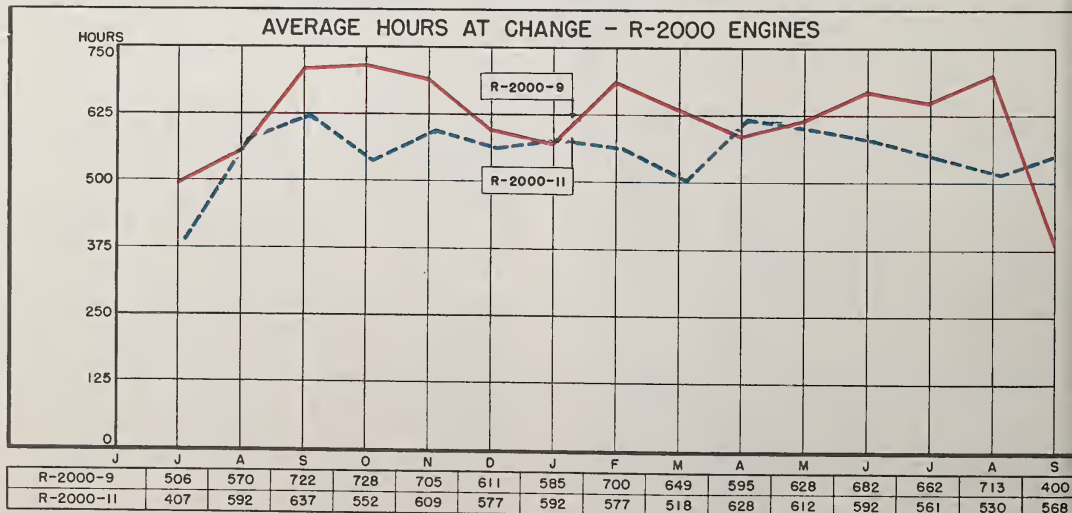
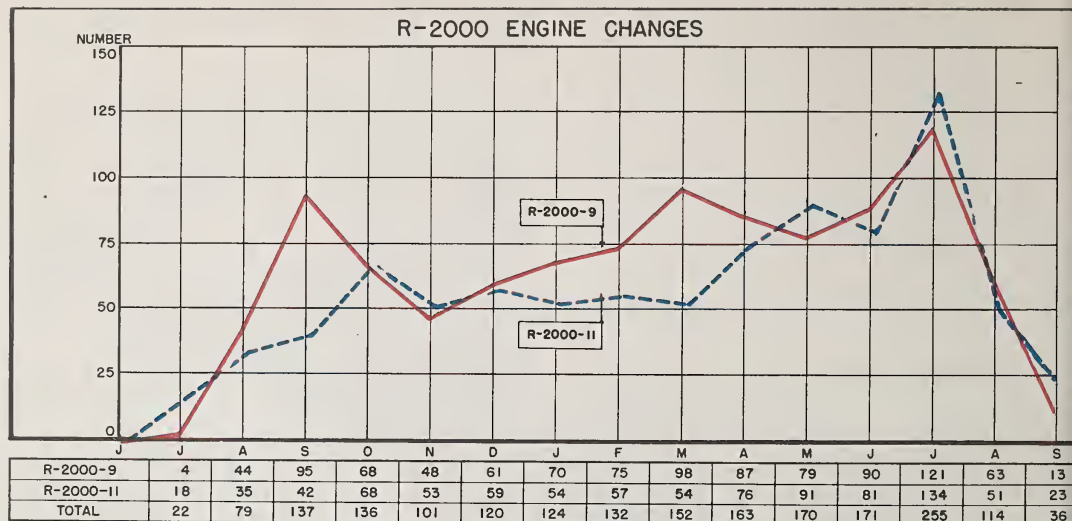
Approximately 160 daily priority supply cables were dispatched before the position of USAFE stocks was such that this daily requisition system was no longer required. Emergency requisitioning was still necessary in many instances but was handled in the normal prescribed manner. As requirements arose for new items which had not previously been used, AMC was so advised with a request for shipments of specified quantities by air, "MARINEX," and routine surface to establish a stock level as soon as possible. The pipeline time for the receipt of supplies from the ZI improved over a period of time, and eventually supplies were being received in approximately one-half the shipping time previously required.

One of the major high consumption items was the

R-2000 engine. Due to the lack of data on the operational characteristics of this engine under "Vittles" conditions, consumption data could not initially be accurately estimated. Therefore, shipments of engines from the ZI during the first few months were not based on actual consumption, and it was difficult to maintain the problem of adequate serviceable stocks on hand in this command. To overcome this problem a "Weekly Report of R-2000 Engine Status" to Headquarters AMC was inaugurated. This report afforded information to the AMC Engine Section as of 1200 hours each Friday and contained the following items:

- (1) Quantity of R-2000-9 serviceable engines on hand at end of period.
- (2) Quantity of R-2000-9 reparable engines on hand at end of period.
- (3) Quantity of R-2000-11 serviceable engines on hand at end of period.
- (4) Quantity of R-2000-11 reparable engines on hand at end of period.
- (5) Quantity of R-2000-9 serviceable engines received from ZI during period.
- (6) Quantity of R-2000-11 serviceable engines received from ZI during period.
- (7) Quantity of R-2000-9 reparable engines returned to ZI during period, and method of shipment.
- (8) Quantity of R-2000-11 reparable engines returned to ZI during period, and method of shipment.
- (9) Quantity of R-2000-9 engine changes during period, and average engine hours.
- (10) Quantity of R-2000-11 engine changes during period, and average engine hours.
- (11) Average daily flying hours per assigned aircraft during period.

Rhein/Main Air Base, the command C-54 Specialized Depot Activity, was designated as the only installation which would receive engines from or ship engines to the ZI; hence it was the only air base reporting items (5) through (8) on the report. Daily teletype reports from all



"Vittles" bases served as a basis for preparation of one report by Headquarters USAFE.

Upon receipt of the report, AMC scheduled automatic shipments of serviceable engines to USAFE as deemed appropriate to the weekly consumption and "stock on hand" data. Air delivery from Mobile, and "MARINEX" from the New York Port of Embarkation (NYPE), were the optional shipping routes.

Other information contained in the report enabled AMC to schedule reparable engines shipped direct by USAFE to the overhaul depot at San Antonio Air Materiel Area (SAAMA). During the major portion of "Vittles", reparable engines were transported by air to maintain a full pipeline of engines between Europe and the ZI overhaul depot.

To expedite engine availability, an engine build-up line was established at Rhein/Main Air Base. At the height of the Lift, engines were built-up at the rate of seven to nine per day. Based on consumption, stock levels of built-up engines were established at each base and maintained via priority rail and air shipment from Rhein/Main Air Base. "Reparables" generated at each base were rushed to Rhein/Main, where the demountable power plants were removed prior to shipment of the engines to the ZI.

In addition to the weekly report from USAFE to AMC, cables were dispatched to USAFE from NYPE and Mobile Area Materiel Area (MOAMA) indicating quantity, type, date of departure, and estimated date of arrival of engines

enroute. Based on this information Rhein/Main Air Base maintained current records of quantities due in and expedited deliveries from the Bremerhaven Port of Embarkation. These procedures proved extremely satisfactory in eliminating the potential engine supply problem.

During the winter flying season the greatest single deterrent to operations was the weather. A large supply of isopropyl alcohol was required for use in removing the snow and ice that accumulated on the aircraft surfaces while the aircraft was on the ground. Monthly requirements for the alcohol were forwarded to AMC. That command initiated immediate procurement action and expedited automatic shipments of alcohol from early November through late March.

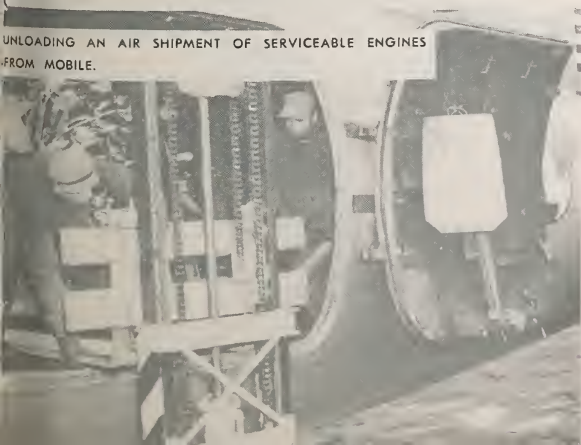
The F-1 aircraft heater was utilized as a space heater for maintaining warmth in the individual maintenance shelters constructed at "Vittles" bases. The procurement of sufficient heaters for this purpose necessitated withdrawal from the T/O&E equipment authorization of some USAFE units not directly supporting the Airlift. Even then complete requirements were not fulfilled until an emergency requisition had been forwarded to AMC for emergency procurement action to obtain the additional heaters required.

Whereas the F-1 heater was originally intended for operation of only 3 to 4 hours, its use as a space heater entailed practically continuous operation. Such usage

shortened its serviceability and necessitated extra repair. To alleviate this situation, an overhaul line was established at the Bruck Air Ordnance Depot (Vehicle Repair Depot) for processing reparable heaters on a priority schedule. Stocks of repair parts for Bruck were maintained by emergency requisitioning and shipment from the ZI to Erding Air Base. During the summer months each base turned in all heaters for reconditioning and repair. As heaters were returned to serviceability Bruck transferred them to Erding Air Base for stock in anticipation of future requirements.

Other extremely high consumption items included C-54 casings and tubes. Again, the impossibility of estimating reliable requirements was encountered; therefore, it was necessary for AMC to arrange for automatic shipments of these items. In instances where contractor procurement was effected, direct shipments were made from the contractors to USAFE.

The ever-increasing number of landings with maximum loads caused a proportionate increase in the monthly consumption of casings and tubes. However, the steady flow of automatic shipments from the ZI enabled USAFE to provide each base with sufficient stocks to eliminate the possibility of aircraft becoming grounded for lack of casings or tubes. Too, these shipments allowed Rhein/Main Air Base to accumulate sufficient stocks so that incoming rubber shipments from Bremerhaven were in many cases re-routed in carload lots to other Airlift bases.



UNLOADING AN AIR SHIPMENT OF SERVICEABLE ENGINES
FROM MOBILE.



TIRE STOCKS AT RHEIN-MAIN.

AOCP CONTROL

Of primary importance to all supply personnel engaged in the support of aircraft is the maintenance of the lowest possible daily AOCP rate (Aircraft Out of Commission for Parts). The effect of even one aircraft AOCP can well be realized when it is considered that the average load per C-54 aircraft in commission per day was 44 tons. With the periodic assignment of additional aircraft and the step-up in operations, the drain on world-wide C-54 stocks was ever-increasing. Aircraft parts and supplies were consumed at a rate far in excess of the rate at which they could be procured, brought into USAF supply channels, and delivered to using installations. Certain high-consumption items were of a continual "emergency" nature. It was evident that special supply measures were

necessary to combat the situation.

To meet the problem, an AOCP Control Section including both Supply and Maintenance personnel was organized at Headquarters USAF. A special technical supply teletype network of the dual-conference type was installed. Primary purpose of this net was to provide the most expeditious method of transmitting supply priority requisitions and information on the action taken thereon. The network linked the four operational bases, the Specialized Depot at Rhein/Main AB, the Erding Air Depot, and Headquarters USAF. Headquarters CALTF was later added. From the information received over the network, a master AOCP Status Board was maintained showing

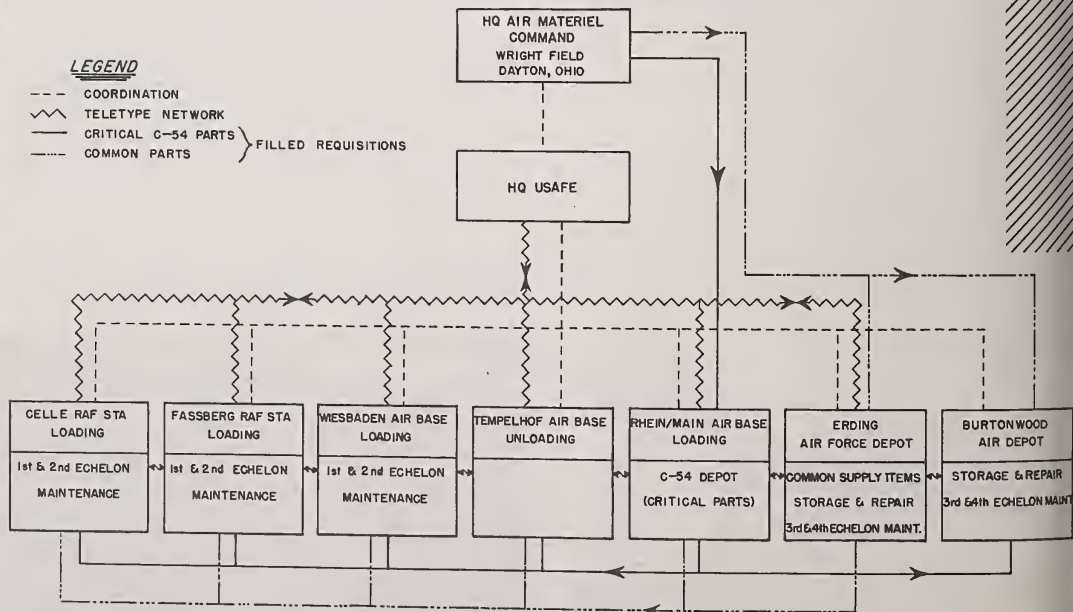
each AOCP aircraft, its location, parts causing the AOCP and the up-to-the-minute action being taken to alleviate it.

A record card was maintained for each item that caused an AOCP, and as AOCP's occurred, information was immediately obtained and posted to the card, which reflected the supply status of the missing item at each installation.

The accompanying graphs outline the C-54 AOCP trend during the full Airlift period and a six-month record of the number of repeat AOCP items by class.

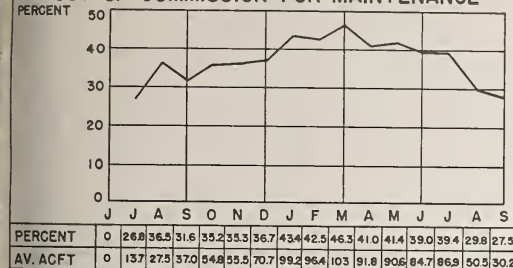
Although the first factor was to satisfy the current AOCP demand, it was necessary at the same time to take all action possible to eliminate any future AOCP for the

AIRLIFT SUPPLY AND AOCP NETWORK



STATUS OF AIRLIFT C-54 AIRCRAFT

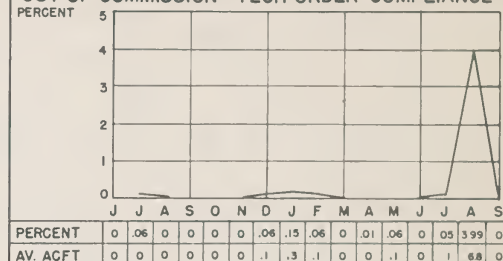
OUT OF COMMISSION FOR MAINTENANCE



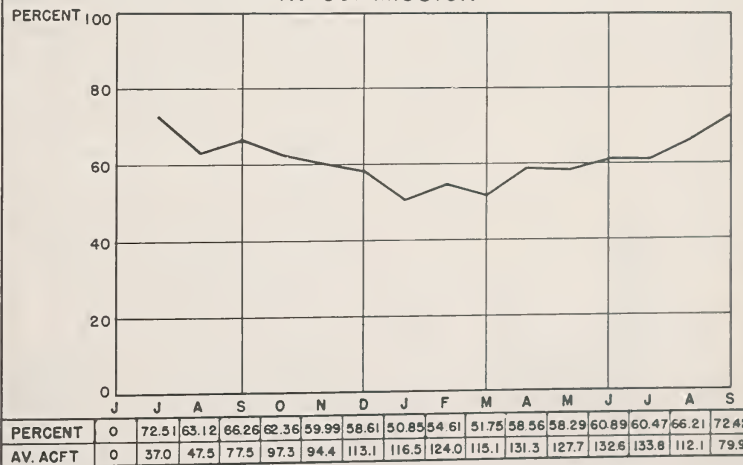
same item. An analysis of the overall command supply status determined the course of action to be followed. Items which were available within the command merely required expedited shipping action to the requisitioning activity. In such instances special flights were arranged if the established air-courier and rail service could not quickly meet the demand. Stocks of the causal item were then redistributed proportionate to the number of aircraft assigned to each base.

Concurrently, Headquarters USAF maintenance per-

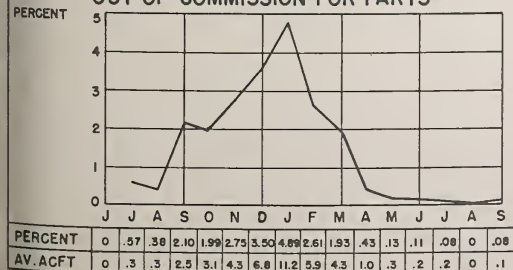
OUT OF COMMISSION - TECH ORDER COMPLIANCE



IN COMMISSION

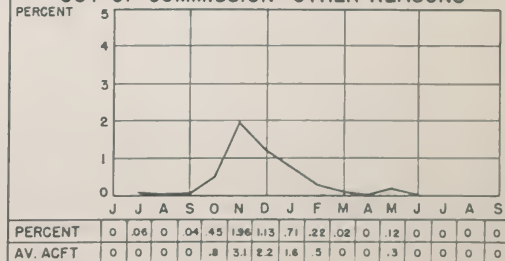


OUT OF COMMISSION FOR PARTS



sonnel reviewed weekly production schedules established at Erding AB and initiated the necessary action to expedite the repair of items in order of their priority. Minimum production schedules necessary to eliminate the item from its critical status were furnished the depot. As critical items were repaired and returned to serviceable stock, the supply status at each base was surveyed and distribution instructions were issued. Repairables beyond the capabilities of USAF repair facilities were shipped by air to ZI repair depots.

OUT OF COMMISSION - OTHER REASONS



ITEMS CAUSING AOCPS - NOVEMBER 1948 THRU APRIL 1949

	NOV	DECEMBER				JANUARY					FEBRUARY						MARCH						APRIL								
USAF PROPERTY CLASS	NO ITEMS AOCPS	NEW ITEMS	NOV REPEATS	DEC TOTAL	TOTAL ITEMS*	NEW ITEMS	NOV REPEATS	DEC REPEATS	JAN TOTAL	TOTAL ITEMS*	NEW ITEMS	NOV REPEATS	DEC REPEATS	JAN REPEATS	FEB TOTAL	TOTAL ITEMS*	NEW ITEMS	NOV REPEATS	DEC REPEATS	JAN REPEATS	FEB REPEATS	MAR TOTAL	TOTAL ITEMS*	NEW ITEMS	NOV REPEATS	DEC REPEATS	JAN REPEATS	FEB REPEATS	MAR REPEATS	APR TOTAL	TOTAL ITEMS*
01-D	88	68	7	75	156	96	14	8	118	252	76	6	8	16	106	328	33	3	4	6	3	49	361	15	3	3	2	0	1	24	376
02-H	6	1	1	2	7	6	1	0	7	13	6	1	0	0	7	19	4	2	1	0	1	8	23	5	1	0	0	0	0	6	28
03-A	2	0	0	0	2	2	0	0	2	4	2	0	0	1	3	6	1	0	0	1	0	2	7	0	0	0	0	0	0	0	7
03-B	1	0	0	0	1	1	0	0	1	2	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
03-C	12	8	5	13	20	17	4	1	22	37	12	3	1	2	18	49	3	0	0	0	1	4	52	1	0	0	1	0	1	3	52
03-D	0	2	0	2	2	1	0	1	2	3	0	0	0	0	0	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
03-F	3	4	1	5	7	9	1	0	10	16	10	1	0	2	13	26	2	1	0	1	0	4	28	0	0	0	1	0	0	1	28
03-G	7	4	0	4	11	1	1	0	2	12	0	0	0	0	0	12	2	2	0	0	0	4	14	0	0	0	0	0	0	0	14
03-H	2	3	0	3	5	5	1	2	8	10	3	1	2	1	7	13	0	0	0	0	0	0	13	0	0	0	0	0	0	1	13
03-I	6	5	3	8	11	17	4	2	23	28	3	1	2	7	13	31	4	2	0	2	0	8	35	2	1	0	0	0	0	3	37
03-J	1	0	0	0	1	0	0	0	0	1	1	0	0	0	1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
04-A	11	11	0	11	22	18	0	0	18	40	21	0	0	1	22	61	3	1	1	0	1	6	64	4	0	0	0	0	0	4	68
04-B	5	0	2	2	5	0	2	0	2	5	1	2	0	0	3	6	2	0	0	0	0	2	8	2	0	0	0	0	1	3	10
04-D	1	1	0	1	2	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
05-C	6	2	1	3	8	2	2	0	4	10	2	0	0	0	2	12	0	0	0	0	2	2	12	0	0	0	0	0	0	0	12
05-D	0	4	0	4	4	5	0	2	7	9	3	0	3	3	9	12	1	0	1	1	0	3	13	1	0	1	0	0	0	2	14
05-F	1	0	1	1	1	0	1	0	1	1	0	0	0	0	0	1	1	0	0	0	0	1	2	1	0	0	0	0	0	1	3
05-G	2	1	0	1	3	4	1	0	5	7	7	1	0	0	8	14	0	1	0	0	1	2	14	0	0	0	0	0	0	0	14
07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1
08-B	0	4	0	4	4	3	0	1	4	7	0	0	0	1	1	7	0	0	0	0	0	0	7	0	0	0	0	0	0	0	7
16-A	1	0	1	1	1	0	0	0	0	1	0	1	0	0	1	1	4	1	0	0	0	5	5	0	0	0	0	0	0	0	5
16-E	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1
23-A	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
29	1	1	0	1	2	6	0	0	6	8	2	0	0	0	2	10	5	0	0	0	0	5	15	2	0	0	0	0	0	2	17
TOTAL	156	119	22	141	275	194	32	17	243	469	150	17	16	34	217	619	66	13	7	11	9	106	685	33	5	4	4	0	3	50	717

* REPRESENTS NOVEMBER ITEMS PLUS NEW ITEMS TO DATE

Aircraft undergoing reclamation were always checked for AOCF parts not otherwise available within the command. Cannibalization, utilized in many instances to get another ship back on the Lift, was controlled by a daily report to USAFE from each base. Headquarters AMC was continually abreast of the picture on critical items through requisitioning information sufficient to enable them to expedite deliveries and to follow up on shipments in process. Restriction of issues of C-54 parts solely for the Airlift, except in emergency cases, aided considerably in removing many items from the "critical" list.

To review station supply levels and assist base supply personnel, teams were dispatched to Airlift bases with itemized lists of critical items and supply statistics obtained from the records maintained at Headquarters USAFE. This action was based on the theory that an AOCF at one air base was always a potential AOCF at others. The emphasis placed on the elimination of AOCF's was so great that all supply personnel soon became fully "AOCF-conscious."

In an effort to further the efficiency of supply support, a special monthly C-54 Stock Balance and Consumption Report was initiated in March 1949. This report proved a valuable asset to supply personnel. Analysis of each

month's report furnished statistics which almost dictated the action necessary to improve the supply status of each item both at depot and at base level. The information contained in the report was also utilized to fill AOCF and ASSOC (priority requisition) requests, to redistribute theater stocks, to insure that adequate stocks to maintain theater levels were on hand or due in, to determine repair priorities, to expedite repair in accordance with stock status reflected in the report, to maintain follow-up and to expedite shipment of quantities due in from ZI depots where warranted, and to submit emergency request requisitions where applicable. Review of subsequent reports indicated for each individual item the degree of improvement since the last report.

The supply phase-out of the Airlift was accomplished in accordance with the "Vittles" Phase-out Plan. The processing of Air Force supplies was accomplished in an efficient manner by the accountable and Air Force supply officers at the Airlift stations.

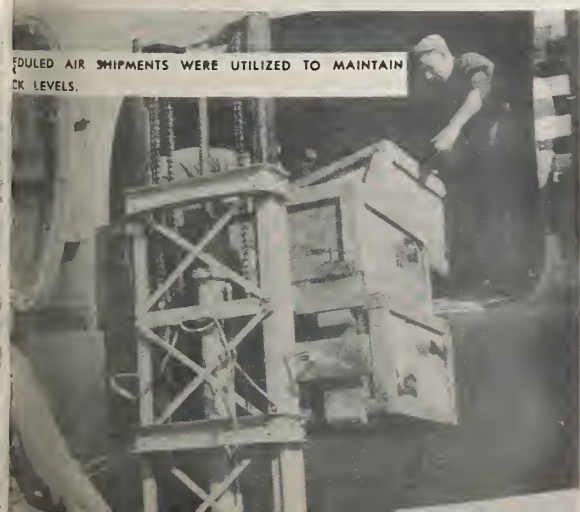
ELECTRONICS

Communication facilities and navigational aids are two of the essentials of air travel. Without them the Airlift would have been impossible.

At the first indication that there would be an Airlift operation, a communications conference was held at Headquarters USAFE to consider communication and navigational aids required for the operation. It was obvious to all concerned that the degree of success or failure of the operation depended greatly on the expeditious procurement of electronics equipment and replacement parts as the requirements arose.

As outlined at the beginning of this chapter, the Theater Supply Disposal Program was nearing completion when the Airlift began; but large quantities packaged for over-water shipment were stored at Erding Air Depot awaiting shipment.

After the initial plans for the Airlift were drawn up and electronics requirements determined, supplies at Erding, plus those in the hands of OFLC which had not been committed, were recalled, unpacked, and re-shelved. Due to the vast quantity of this equipment an internal theater electronics supply system was set up, utilizing



FOULDED AIR SHIPMENTS WERE UTILIZED TO MAINTAIN STOCK LEVELS.



A TRAILER OF RADAR EQUIPMENT ENROUTE TO AN AIRLIFT POSITION.

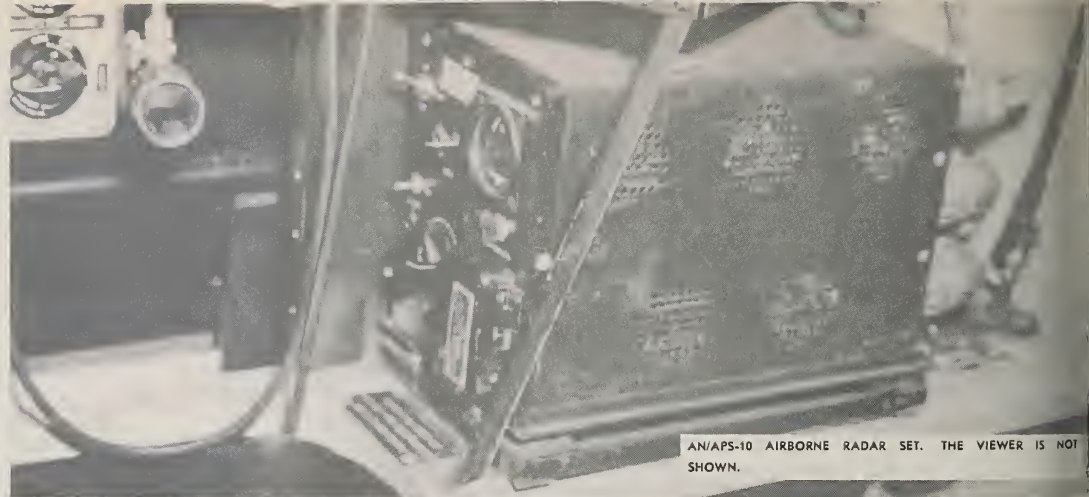


ENGINES COMING OFF THE BUILD-UP LINE AT RHEIN/MAIN

equipment on hand. Much of this equipment was in an unserviceable condition, and the repair requirement at that time was far greater than the physical capacity of the depots. Nevertheless, this equipment was the basis of the operations carried out.

Initial Airlift electronic requirements called for low-frequency radio beacons for use with the airborne radio compass, AN/ARN-7. To expedite the installation, a mobile-type unit consisting of a BC-191 transmitter, RA-34 rectifier, PE-97 power units, and associated equipment was installed in a 21/2-ton, 6x6 truck with an HO-17 shelter. This equipment permitted movement of the beacon and facilitated its being placed into immediate operation.

The BC-191 radio transmitter was not designed for continuous operation. Since supply levels in the command had been reduced prior to the Airlift, maintenance for this equipment was not readily available. The RA-34 equipment continually failed due to faulty selenium rectifiers. Because of the shortage of keying equipment, only one keyer could be initially installed with each beacon installation; any failure in the keying mechanism thereby pre-



AN/APS-10 AIRBORNE RADAR SET. THE VIEWER IS NOT SHOWN.

cluded beacon identification.

Fortunately, USAFE was eventually able to procure from depots in the ZI sufficient keyers to make possible the installation of duplicate keyers at all radio beacons.

In September 1948 the Air Navigation Board decided to employ T-5 high power beacons to replace the temporary low power BC-191 radio beacon installations. These were requisitioned in September for the Airlift from the ZI and through expeditious procurement action the equipment arrived in the command in February 1949. After the equipment was installed, it was discovered that since it was designed for high output emission, this type of radio beacon interfered with various European radio stations operating in the same frequency, and added to the difficulties already encountered.

Concurrently with the installation of the radio beacons, arrangements were made by Headquarters USAFE to obtain visual-aural ranges (VAR) from the Civil Aeronautics Authority. CAA radar engineers were assigned to the Airlift to accomplish the installations. One range was airlifted to the theater, and five others were transported by "MARINEX." CAA engineers surveyed the sites, completed installation, and had the first ranges operating in January 1949. It is interesting to note that USAFE had

difficulty in obtaining parts to maintain this equipment. The spare parts were peculiar to CAA equipment, and there were no established Air Force channels through which these supply and maintenance parts could be obtained.

Fan marker beacons were another problem. They were not available in the United States and had to be procured by AMC. However, during the latter part of February 1949 the installation of the first marker beacon was completed. The equipment for the beacon at Celle arrived during May. Since plans were then already made for the phase-out of the operation, installation of the Celle beacon was not completed.

Plans formulated during the fall of 1948 indicated a requirement for radar navigation equipment consisting of AN/APS-10 as the airborne radar set and AN/CPN-6 as the ground radar beacon. Because there were insufficient AN/APS-10's available, Headquarters USAF decided to use both AN/APS-10 and AN/APS-4 for airborne radar sets.

An initial USAFE survey indicated that only a small percentage of the assigned C-54's had the airborne radar equipment installed. Consequently, equipment and stock levels of maintenance parts had to be requisitioned from



A POINT-TO-POINT COMMUNICATION POSITION.



the ZI to allow installation on all Airlift C-54's.

After the radar sets began arriving, they were installed in the C-54 aircraft while aircraft were undergoing maintenance. By May 1949 the installation of the airborne radar equipment had been completed. The shortage of spare parts for these sets created great difficulty in their maintenance. Spare parts for the equipment were not available in the command, and only limited quantities were available in the ZI. The radar beacons, AN/CPN-6, were fortunately found in storage at Burtonwood in November 1948. The original requirement as submitted to DCS/M by Headquarters 1st ALTF was for the installation of 12 AN/CPN-6 beacons with three duplicate installations in Berlin.

With the start of the Airlift, a requirement was established for duplicate GCA equipment at all Airlift bases. Available GCA sets within the command were immediately moved to the bases, and the balance required was requisitioned from the ZI. To satisfy the requirements for GCA in Berlin, AMC prepared a GCA set in the ZI for airlift by C-82 aircraft to Tempelhof. The trailer body was cut in two pieces prior to air shipment and reassembled in Tempelhof for movement to Gatow. In addition to the air transportable set furnished Gatow, an air transportable

GCA AN/CPN-4 was also airlifted from the ZI for use at Tempelhof.

This new type GCA (AN/CPN-4) was a non-standard piece of equipment; consequently, the supply of spare parts was not available within Air Force channels. To expedite supply directly from the manufacturer, AMC established a separate supply channel for this item of equipment. This deviation in supply channels caused supply personnel many headaches; many of the items became lost enroute, and others were delivered to the wrong places. Since electronic items are highly technical equipment, when an item of electronic equipment arrived at an air base, inexperienced supply personnel would often put it aside and forget it. Tubes and other spare parts for the AN/CPN-4 were always in critical supply.

All GCA was placed on a 24-hour operation schedule at the start of the Airlift and continued on that schedule during the operation. However, the high voltage transformer designed for interim operation continually failed and became a critical item of supply. Every effort was made to secure this item from the ZI. When that source failed, local procurement action was initiated. Some of the transformers were locally rebuilt and others were locally manufactured.

In addition to the AN/CPN-4 equipment mentioned above, an AN/CPS-5 ground approach radar set was airlifted from the ZI for operation in Berlin. This new radar set presented supply difficulties because many of its component parts were pre-production models built by commercial laboratories in the ZI. Spare parts were unavailable when it arrived for installation in Berlin, and many of the components were not even listed. Whenever an item was required, it was necessary to cable the manufacturer with a description of the part to insure that he would ship the correct items to Berlin.

Consumption experience dictated the supply levels to be established for all electronic equipment. As consumption experience was gained, levels had to be revised and reset. VHF radio set AN/ARC-3, the airborne 8-channel set installed in C-54's, presented considerable difficulties because certain radio tubes for the airborne equipment had not been engineered for this type of operation. It was impossible to keep a sufficient supply on hand; the tubes were used up as fast as they were received. Quite as suddenly as they started burning out, these tubes instead began to enjoy a long life, and excess stocks on hand became a headache.



RADAR TECHNICIANS CALIBRATING A GCA UNIT AT BERLIN.

GENERAL SUPPLY

The General Supply Division was responsible for determining requirements and coordinating with Headquarters EUCOM for the procurement, storage, maintenance, and distribution of food and mess equipment, clothing for personnel flying or serving the Airlift, gasoline for aircraft and ground vehicles, and the myriads of other quartermaster items of individual, organizational, and station supplies and equipment.

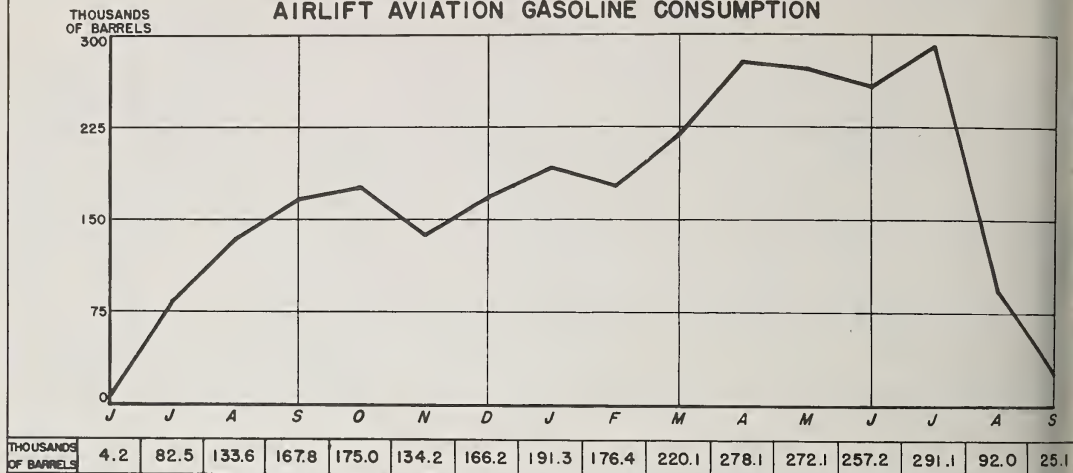
At the time the Airlift started, United States inventories of reserve stocks of aviation fuel were such that Air Force commanders throughout the world were furnished allocations on a month-to-month basis. Prior to the Airlift, Air Materiel Command had budgeted for aviation petroleum products on the basis of normal flying hours per aircraft; but with the start of the Lift and the attendant increase in flying hours per aircraft, a precarious petroleum supply position developed.

Ships on the high seas carrying cargoes of aviation gasoline to other destinations were diverted to Bremerhaven. The U. S. petroleum industry was pressed to the utmost to supply from scheduled production the sudden tremendous demands of the Airlift, the normal demands of the remainder of the Air Force, and the other military and civilian commitments. An added problem for the petroleum industry was the requirement that only aromatic fuel be used by Airlift planes. The neoprene gaskets and seals used on aircraft fuel systems caused leakage and a great hazard to efficient Airlift operations if exposed alternately to aromatic and nonaromatic fuels.

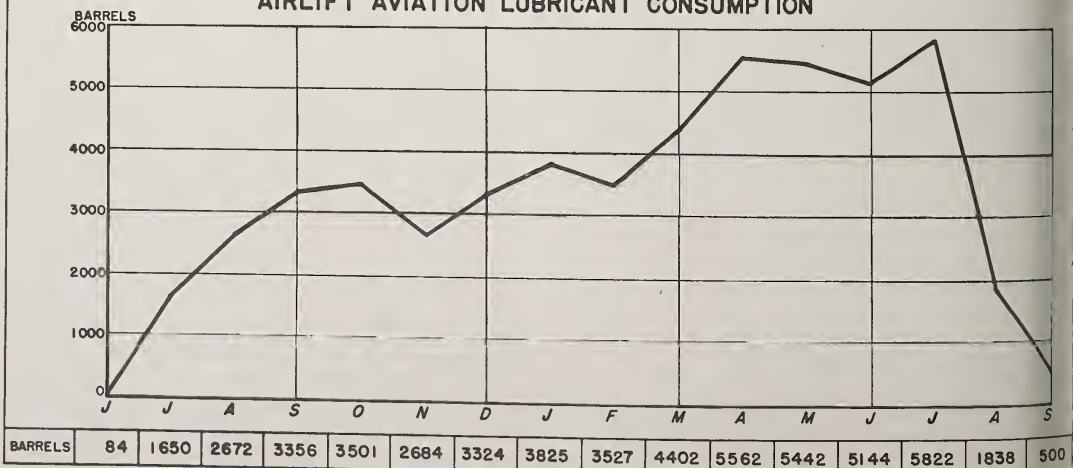
During the year prior to the start of the Airlift, USAFE's monthly consumption of aviation gasoline averaged about 30,000 barrels. In the month of July 1948 approximately 82,500 barrels of aviation fuel were consumed. By January 1949 the monthly consumption had climbed to 191,000 barrels, and in July 1949 a peak exceeding 291,000 barrels was reached.

The accompanying chart reveals graphically the quantities of aircraft fuel consumed by USAFE Airlift operations alone. The cumulative quantity depicted equals the cargoes of 20 size T-2 tankers, each of which has a capacity of

AIRLIFT AVIATION GASOLINE CONSUMPTION



AIRLIFT AVIATION LUBRICANT CONSUMPTION



AIRCRAFT FUEL CAME BY NAVY TANKER FROM THE UNITED STATES TO BREMERHAVEN.



EUCOM Quartermaster Depot stocks.

British and U.S. rations were pooled, and all troops were fed the combined ration. A number of components of the British ration, such as herring and tea (in lieu of coffee) for breakfast, proved unappetizing to the American palate. Too, the British ration consisted of about 2,600 calories, as compared to about 3,600 calories derived from the regular field ration "A" fed U.S. airmen.

In order to make up for the caloric deficiency in the British ration, the American type "A" ration for Celle and Fassberg was increased 15 percent. A further increase to 25 percent was made in December 1948. However, after due trial at Fassberg, it was found that an increase of 15 percent was adequate.

Military personnel were fed mainly on "A" rations inasmuch as they were preferred by all troops, thus leaving the British rations for the German employees. As a result, there was a daily saving to American stocks of 300 German rations. This method of feeding the Germans also permitted return to the Bremerhaven Port of Embarkation of excesses of some components of the type "A" ration.

The additional Airlift personnel at Wiesbaden Air Base



... AND BY TANK-CAR, THE FUEL CAME TO AIRLIFT BASES



5,460,000 gallons. To this quantity must be added approximately another two percent for the aircraft lubricating oil shown on the other chart. Additional large quantities of aviation petroleum were consumed throughout the rest of the world in support of the Berlin Airlift.

In addition to the responsibility of planning increases in petroleum products, General Supply had to provide coordination with EUCOM, so that adequate quantities of food would be in the right places at the right time, and maintain food service supervision. Supply of subsistence did not pose any unusual problems; adequate stocks were always available at quartermaster depots to meet the increased Airlift food requirements.

In consonance with verbal agreements between BAFO and USAFE, joint dining facilities for American and British personnel were established at Celle and Fassberg. Mess halls in permanent-type buildings built and used by the German Air Force furnished all dining space required. However, very little equipment was available; and before messes could be established, items such as dinnerware, glassware, tableware, kitchen utensils, mechanical equipment, and refrigerators had to be requisitioned from the Bremerhaven Port of Embarkation or direct from

were easily absorbed, for messing, in the consolidated dining hall. At Rhein/Main Air Base, however, it was necessary to expand existing facilities and to improvise others. At the peak of the operation, messing facilities at Rhein/Main were severely overtaxed and inadequate. One of the two flight-line messes was in a building formerly condemned for a radio shack. The consolidated mess, built to accommodate 1,500 persons, averaged 4,000 per meal during the Airlift.

The use of flight-line messes for a special Airlift operation is recommended. Line messes not only will prevent disastrous overcrowding of regular messes, but will save up to an hour for each man who must otherwise return for his meal to a mess in the vicinity of his barracks. It will be noted that during an around-the-clock operation the "dinner" meal should be available at any time during the day or night.

At Fassberg and Celle, because of the rapidity of developments, supply personnel were not always among the first to arrive. Even Wiesbaden and Rhein/Main Air Bases, which were established installations when the Airlift began, experienced such rapid growth that base supply problems were serious. Entire squadrons arrived by air

without quartermaster equipment. Many men came with summer clothing only. T/O&E and station equipment was obtained from quartermaster depot stocks. Quartermaster items from paper clips to forklift trucks were supplied, but each air base had to inform the supply depot of its requirements. Lack of sufficient trained supply personnel made almost impossible the maintenance of records on which requisitions could be predicated. Nevertheless, adequate quantities of quartermaster supplies were received at all Airlift stations.

Following are the tonnages of quartermaster Class II and IV supplies flown to Berlin to support operations there during the first six months of the Airlift:

MONTH	TONS
July 1948	7.2
August 1948	91.58
September 1948	105.97
October 1948	105.7
November 1948	87.4
December 1948	81.6

In addition to making plans for quartermaster supplies, the General Supply Division coordinated with EUCOM in order that quartermaster services such as laundry, dry cleaning, and shoe repair might be available. Scrap and salvage disposal and repair of quartermaster equipment also were involved. If an air installation had difficulty rendering any necessary quartermaster service, assistance was obtained from EUCOM. Such assistance was complete at Fassberg and Celle. The Bremerhaven Port of Embarkation, backed by the Giessen Quartermaster Depot, not only furnished Celle and Fassberg with dry stores, perishable foodstuffs, and all other quartermaster supplies, but also made available the various quartermaster services.

The EUCOM Exchange Service (EES) furnishes all exchange facilities throughout the European Command. A USAFE officer in the General Supply Division maintains liaison with EES.

In addition to the regular EES snack bars at all EUCOM stations, additional mobile snack bars were maintained

during the operation at all Airlift bases, including Tegel and Gatow.

The Wetzlar Post Exchange Officer operated exchange facilities at Celle and Fassberg. The headquarters of EES assigned that responsibility to the Wetzlar PX since Wetzlar Military Post, the northern-most in the U. S. Zone, is the closest to Celle and Fassberg. The Fassberg and Celle exchanges were in operation within three weeks after USAFE made an official request for exchange service.

During the Airlift many exchange articles were in short supply. This was due to a directive by Headquarters EUCOM that the exchange system would be financially solvent by 30 November 1948. In order to achieve solvency and reduce inventories, large quantities of surplus stocks were offered to customers at reduced prices and EES eliminated or postponed the purchase of sufficient quantities of at least 4,000 "must" and "essential" items.

All station exchanges received full allocations of available merchandise except Rhein/Main Air Base. During most of the Airlift the personnel strength at Rhein/Main was credited to the Frankfurt Post Exchange, which received a percentage of merchandise that should have been allocated to Rhein/Main. Toward the end of the Airlift this matter was corrected, but not in time to obtain the additional merchandise in the Rhein/Main store before the Lift ended.

Tempelhof Branch Exchange received only the "must" and "essential" items during the Airlift because of restricted air cargo shipping space.



CONCLUSIONS

Electronics supply personnel should be brought into the early planning stages to determine availability of electronic equipment necessary to perform desired functions.

Duplicate installations should be made for all radio beacons and ground control approach equipment. There should be standby spares provided for control tower radio. Two sources of power for all installed ground electronic equipment must be made available to insure continuous operation.

Authorization for additional vehicles at the same time as the base or unit is activated will enable expeditious issue of vehicles.

The establishment of post exchange facilities should be concurrent with the movement of personnel into a new base.

The utilization of standard items of equipment, wherever possible, will reduce work load required for requisitioning, storage, and issue. An AOCP and VDP staff agency should be established at Task Force Headquarters for any Airlift operation, for the purpose of researching, recording, and expediting the supply of parts to reduce VDP's and AOCP's.

Normal supply channels should be used at all times. The employment of non-Air Force channels for certain items of supply has a tendency to confuse, complicate, and at times to jeopardize operations.

MAINTENANCE



MISSION

Although USAF allocated 324 C-54 aircraft to the Airlift and support thereof, statistical records covering the six peak months of Vittles Operation reveal that an average of approximately 128 C-54 aircraft were "in commission" daily. In other words, there were 128 aircraft actually available to perform the prime mission of Vittles — that of carrying tonnage into Berlin. The fact that there were 196 more aircraft allocated than were available for daily missions was generally lost sight of in the maze of statistics and analyses of Airlift operations. What became of these 196 aircraft and why were they not available for daily utilization? The answer is MAINTENANCE.

Tech Order No. 00-2A-1 formally defines "maintenance" as the normal upkeep and preservation of equipment which may be expected to recur from time to time in consequence of usage, wear and tear, or deterioration by the elements. It is further defined by Webster: "To hold or keep in any condition, especially in a state of efficiency or soundness."

The aircraft engines, accessory equipment, communications and radar installations, and all the myriad items that make a C-54 aircraft fly reach a staggering total of more than a quarter-million pieces or parts that are subject to wear and tear and, consequently, must be maintained — if not in perfect order, at least in such condition as to insure complete safety for the aircraft, its crew, and its cargo. It was, therefore, the mission of the Maintenance Directorate at USAFE Headquarters and maintenance organizations at all lower echelons to organize, obtain necessary personnel and equipment, and utilize every resource to insure adequate maintenance support of the aircraft flying the Airlift. Similar maintenance support had to be provided also for some 1,600 vehicles and 500 items of powered ground equipment used in Airlift base functions and radio and radar installations both in aircraft and on the ground.



THE LOAD AND APPROACH MADE FOR HARD LANDINGS AND OVERTHOOTING OF RUNWAYS.



GROUND TRAFFIC OPERATION ENDANGERED AIRCRAFT.



EXCESSIVE ENGINE GROUND TIME CAUSED OVERHEATING.

SOURCES OF MAINTENANCE WORKLOAD

Aircraft Utilization. The Airlift maintained an unprecedented utilization of 8 to 10 hours per day per assigned aircraft. This utilization imposed a tremendous load on maintenance as well as creating new problems peculiar to the locale and nature of the mission. Because it was possible to establish bases within a few hundred miles of Berlin, landings far exceeded the number of landings normally expected in an air transport operation. Statistics indicated that while accumulating 586,901 flying hours, 379,926 landings were made. Half of these landings were made with a gross weight of approximately 68,000 pounds — much higher than the normal allowable landing gross weight. GCA weather landings and the glide angle approach at Tempelhof Air Base were responsible for many hard landings and overshooting of runways. All of these factors increased maintenance workloads immeasurably.

Loading and Unloading. While close control of cargo loading was exercised and every possible precaution was taken to avoid damage to aircraft, the lack of adequate cargo loading equipment and the speed of the operation inevitably caused considerable damage to doors and door jams. The use of tiedown rods, stringers, and steel cable for securing cargo also resulted in damage to floors which had been originally installed primarily for passenger carriers.

Ground Operation of Aircraft. To prevent delayed take-offs, an unusual condition arose involving excessive engine ground time. There were often from five to nine aircraft waiting take-off at the end of the runways, and statistics show that the ground idling time averaged approximately 30 minutes per trip. Excessive ground time increased the maintenance work load by subjecting seals, gaskets, and ignition wiring to excessive heating which resulted in their deterioration and breakdown. Excessive ground time contributed to engine failures, as did the nature of the short-haul operation. The latter required the use of high manifold pressure and R.P.M. a much greater percentage of time than in a normal C-54 operation.



TIE-DOWN DAMAGED "PASSENGER TYPE" FLOORS AND
CARGO DUST DETERIORATED CABLES AND CONTACTS....

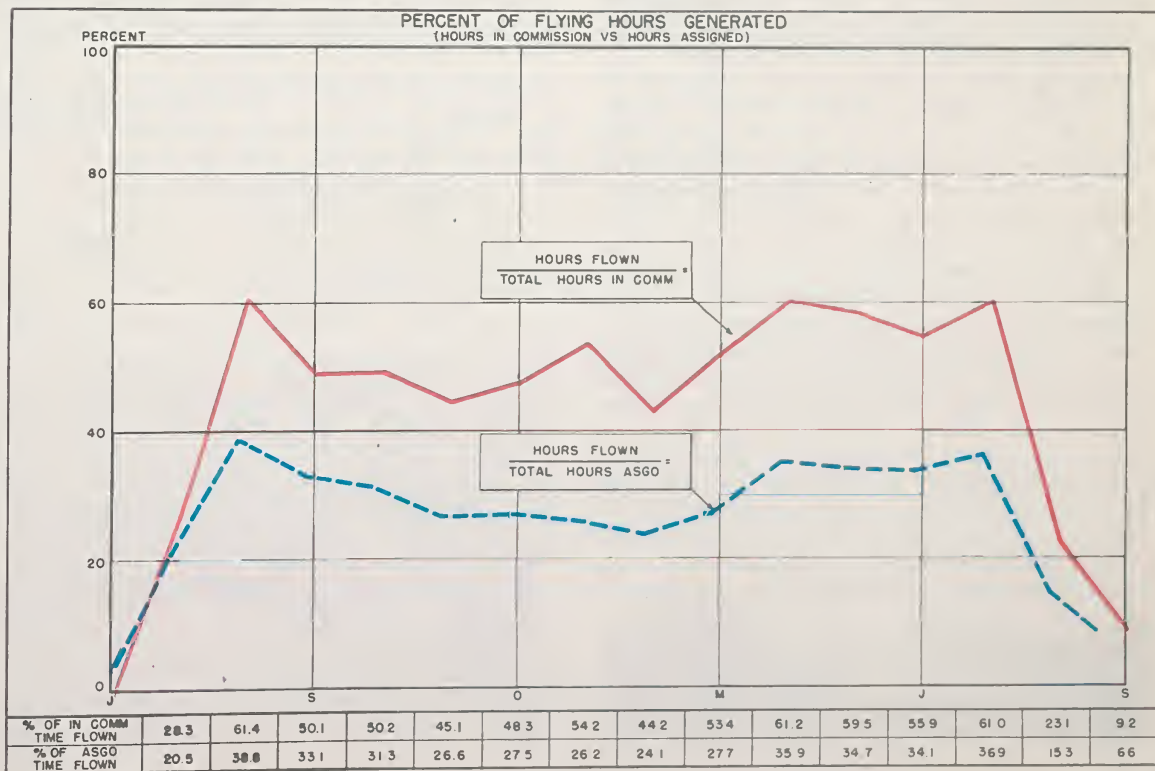


.... AND AUTOMOTIVE EQUIPMENT WORKED AROUND THE
CLOCK.

Cargo. The two principal types of cargo — coal and flour — caused unusual maintenance problems since the dust generated by them was extremely difficult to remove. Coal dust had an abrasive effect on control cables and caused corrosion on electrical contacts, particularly in cannon plugs on the radio wiring.

Ground Handling of Aircraft. The most prevalent type of Airlift mishap was the taxiing accident, which accounted for 34 percent of the total, or 43 out of 126 total accidents. Inadequacy of airport facilities and heavy airdrome traffic, both aircraft and vehicular, were predominant factors. Causes of many headaches for maintenance personnel were the instances where inexperienced crews with inadequate equipment attempted to tow aircraft, subjecting the aircraft to unusual and unnecessary stresses and strains.

Unusual Vehicle Support Requirements. Many of the problems that plagued aircraft maintenance personnel were also present in the operation of automotive and ground-powered equipment. An abnormally high percentage of vehicles had to be assigned on regular 24-hour dispatch to meet the requirements of using organizations. This resulted in an almost complete lack of preventive maintenance and increased shop loads correspondingly. Shortages of equipment, trained personnel, and adequate facilities paralleled those in aircraft maintenance.



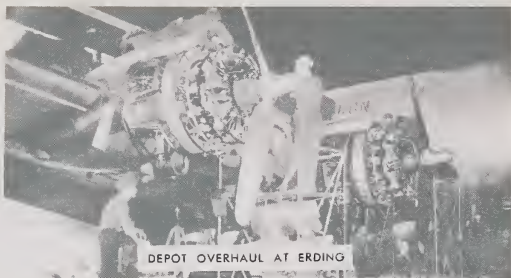
MAINTENANCE ORGANIZATION

Maintenance functions of a base and a group are very closely allied and so interrelated that the over-all control and direction should be under one authority. By having a central control in one place, such as in the office of the Director of Supply and Maintenance, over-all scheduling of maintenance, inspections, engine changes, facilities, and supplies can be controlled in a much more efficient manner. This organizational structure was attempted at one Airlift base, but because of lack of qualified personnel, proper planning and execution, the program foundered, and maintenance reverted back to the squadron system. It is recommended that maintenance organizational structure be designed to fit the mission. Such planning will result in increasing efficiency and immeasurably easing the execution of duties of maintenance personnel.

Generally, Airlift maintenance followed accepted Air Force patterns. However, wing maintenance officers, supposedly operating in a policy and staff capacity under the wing-base plan, frequently found it necessary to take command action as this was the first level where all maintenance functions were centralized.

Maintenance Control. The heart of the maintenance management element, carried through all echelons from squadron to Task Force Headquarters level, was Maintenance Control. It was essential that precise scheduling be organized, and, because of the urgency of the operation, be followed accurately and adjusted as necessary on an

MAINTENANCE CONTROL INCREASED EFFICIENCY.

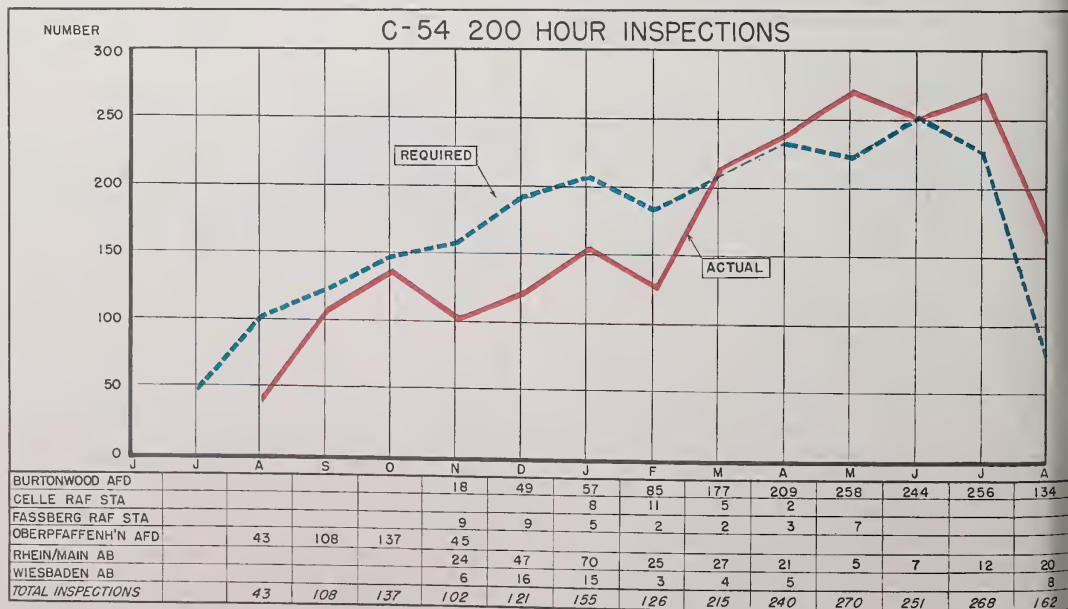


hour-to-hour basis. A standard system of control boards was established and maintained at squadron, group, and higher levels using color codes that indicated at a glance the status of every airplane in the squadron or group and,

on the master control board in Task Force Headquarters, the status of every aircraft in the fleet. The code used follows:

- White Aircraft is operational. (Aircraft in commission)
- Red Scheduled maintenance. (Squadron, routine inspections, Tech Order compliances)
- Green Unscheduled maintenance. (Squadron, breakdowns, engine failures)
- Yellow In base shops for maintenance. (Third and fourth echelon maintenance)
- Blue In 200-hour inspection. (Burtonwood)
- Black Aircraft AOCP (grounded for parts).

To maintain the control board at Task Force Headquarters,





OBERPFAFFENHOFEN INITIALLY PERFORMED ALL 700-HOUR INSPECTIONS.

direct telephone connections were established with maintenance control offices at all bases, and the status of each aircraft was phoned in hourly.

From the hourly information gained from the master control board, it was possible to schedule aircraft to Burtonwood for 200-hour inspection, to the ZI for 1,000-hour cycled reconditioning, and to direct inter-group and inter-squadron transfers of aircraft as required. It was also possible to maintain comparisons between squadrons, to uncover unsatisfactory conditions which arose within the groups, and to eliminate or prevent other difficulties. Concerned primarily with over-all efficiency in scheduling aircraft through necessary maintenance, maintenance control was highly effective in reducing loss factors in the Airlift operation.

Personnel. Airlift experience, confirmed by a comprehensive study by manpower boards from Washington and USAFE, indicated a squadron personnel requirement of 15 maintenance family-group personnel per assigned aircraft (19, if 200-hour inspections are performed by squadrons). That number of personnel with balanced MOS's should under most operating conditions permit a utilization of 8 and possibly 10 hours per day per assigned aircraft. Establishing the requirements was not a particularly

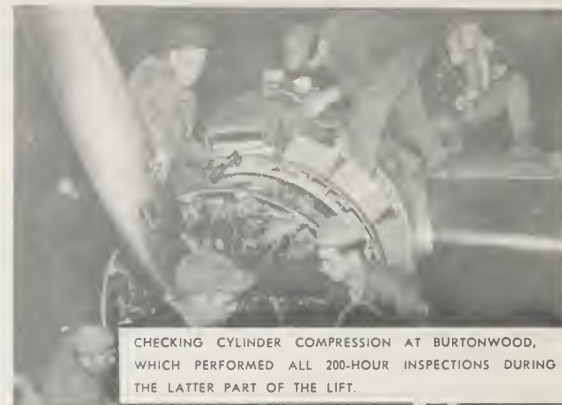
difficult problem, but obtaining well-trained, experienced personnel and retaining them imposed a burden on maintenance officials that should be avoided at all costs. A definite tour of duty and a careful screening of personnel prior to assignment are mandatory. If sufficient qualified maintenance personnel cannot be obtained, and such was the case at the start of the Airlift, a comprehensive on-the-job training program is a necessity.

It was proved beyond a doubt that inexperienced personnel sometimes doubled and even tripled the time required for the most elementary maintenance operation. Many valuable flying hours were lost because personnel were not sufficiently familiar with equipment to locate sources of trouble and to take corrective action. This condition was also responsible for increased requirements for spare parts, as items removed without just cause entered a long and costly pipeline before ultimately being returned to serviceable stocks.

It was not until the final months of Airlift operation that personnel became sufficiently stabilized and trained to perform adequate and satisfactory maintenance on C-54 aircraft; but when this happy stage was reached, a definite improvement was immediately discernible in the accomplishment of the primary Airlift mission. During April, May, June, and July 1949, tonnage averaged better than 190,000 tons per month. This was 60,000 tons a month higher than



GERMAN MECHANICS WERE EXTENSIVELY USED TO BALANCE AIRMAN SHORTAGES.



CHECKING CYLINDER COMPRESSION AT BURTONWOOD, WHICH PERFORMED ALL 200-HOUR INSPECTIONS DURING THE LATTER PART OF THE LIFT.

the average for the previous four months, although the number of aircraft available remained approximately the same.

Because of the personnel deficiencies noted above, it became necessary to recruit and utilize German nationals. At the peak of operation, approximately 80 German mechanics were assigned to each Air Force squadron. Because these mechanics had no prior experience with C-54 aircraft, an extensive training program was required, and it became necessary also to overcome the language barrier. As a result, a translation section was organized by the USAFE Deputy Chief of Staff, Operations, and bilingual inspection check lists were prepared and furnished all activities utilizing German nationals. Ultimately, technical references such as the C-54 Tech Order, Maintenance Hand Book, and AN-1-40NM-2 were similarly translated. Provided with classroom teaching, OJT on the Airlift, and technical publications in their own language, Germans soon became extremely valuable. Their use was demonstrated to be fully practical, and their contribution was of major assistance to the maintenance program.

In order to handle the volume of engine and aircraft technical problems, one Pratt and Whitney and two Douglas Aircraft technical representatives were assigned to the Aircraft Maintenance Section of Headquarters USAFE for duty.

AIRCRAFT MAINTENANCE

Scheduled Maintenance. With aircraft flying 24 hours a day 7 days a week, the maintenance program in support of Vittles required a 168-hour work week and involved first a series of scheduled inspections, and then immediate corrective action when these inspections revealed defects or potential failures.

Each day every aircraft flying the Airlift was given a pre-flight check. This check included such items as measurement of fuel after a run-up, cockpit inspection, inspection of fluids and pressures, hydraulics, landing gear, power plants and nacelles, electrical system, internal and external fuselage, wings, control surface and empennage, and radio and radar inspection. In addition each aircraft was provided with turn-around maintenance, at which time crews took care of deficiencies noted by pilots, and routine maintenance servicing each time a plane landed.

Supplementing the daily pre-flight and turn-around

inspections, more detailed and comprehensive inspections were performed at 50-hour intervals. Thus there was a definite periodic cycle of inspections, identified as First Intermediate Inspection (50 hours), Second Intermediate Inspection (100 hours), Third Intermediate Inspection (150 hours), and Burtonwood Inspection (200 hours). After each aircraft had gone through four such cycles and became due for the fifth, it was returned to the ZI for cycled reconditioning (1,000-hour inspection) by contractors' facilities located in New York, Texas, and California.

The above brief explanation of the inspection cycle, with the accompanying graphic illustration, shows that to keep 128 aircraft flying every day there were 196 additional aircraft either undergoing maintenance or enroute to and from facilities where major maintenance could be performed.

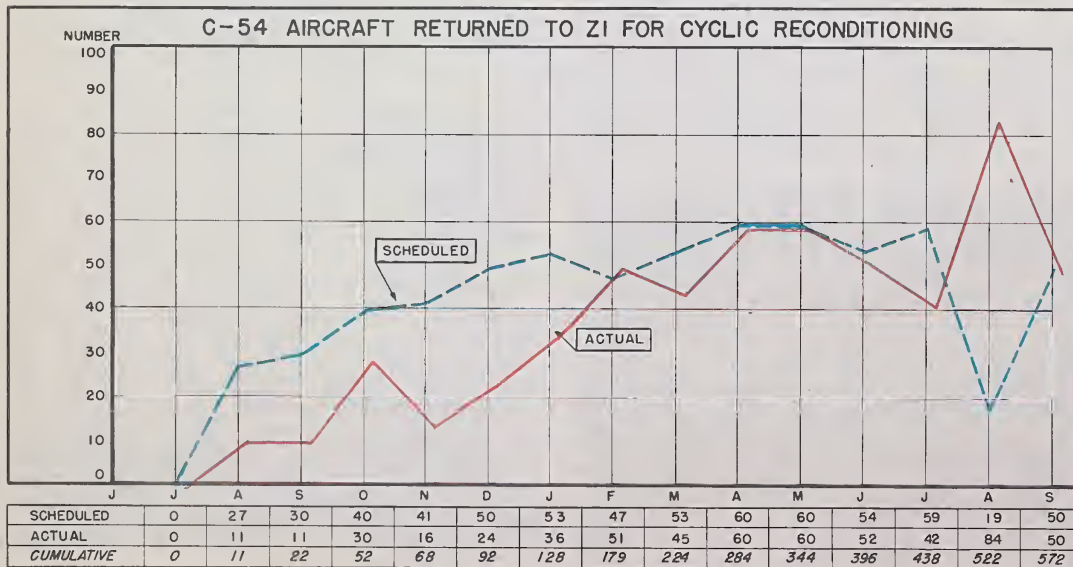
Governing directives are considered adequate for normal transport operations, but it is apparent from this analysis that it was necessary to tailor Airlift inspections

to fit the operation.

There was considerable discussion as to the merits of performing 200-hour inspection at Burtonwood, England, but from the standpoint of maintenance, it was a wise and essential policy determination. In a high pressure operation where continual emphasis is being placed on higher and higher utilization, the group commander is inevitably forced into at least a partial neglect of maintenance. The performance of 200-hour inspections at another base under another command solved this problem, and insured that at least every 200 hours aircraft were given a thorough inspection and necessary repairs by an organization that was not under the same pressure as was the commander at the home station of the aircraft. The same principle applied to the 1,000-hour cycled reconditioning, and the general consensus of opinion among Airlift personnel at the conclusion of the operation was that C-54 aircraft were in far better mechanical condition at phase-out than they had been on entry into the operation.

Unscheduled Maintenance. Significant conditions peculiar to the Airlift operation, which are briefly indicated in the early part of this chapter, led to abnormally high consumption of tires, brake discs, and other brake and landing gear parts. The high rate of consumption for hours flown was reflected in the maintenance effort required to repair, assemble, and install brakes, mount new tires on wheels, and make very thorough inspections of landing gears. Airlift statistics indicate that the main cause of unscheduled maintenance was fuel leaks. These resulted from hard landings and from flying through air whose turbulence caused seams and inspection plates to open. Resealing of fuel tanks consumed approximately 56 percent of field maintenance support.

In an effort to obtain closer control on scheduled and unscheduled maintenance, maintenance personnel devised a form entitled "CALTF Form 10 (C-54 Maintenance Record)." Groups were required to accomplish one of these forms for each aircraft assigned during any one month and to record thereon in the standard color code the portion of each day, broken down to quarter-hour intervals, that



Maintenance INSPECTION CYCLE

324
AIRCRAFT

ALLOCATED BY USAF
TO AIRLIFT AND SUPPORT

128
AIRCRAFT

IN COMMISSION
FLYING AIRLIFT

UNSCHEDULED MAINTENANCE 37 ACFT.
2nd INTERMEDIATE INSPECTION 6 ACFT.
1st & 3rd INTERMEDIATE INSPECTION 5 ACFT.
BASE SHOPS 16 ACFT.

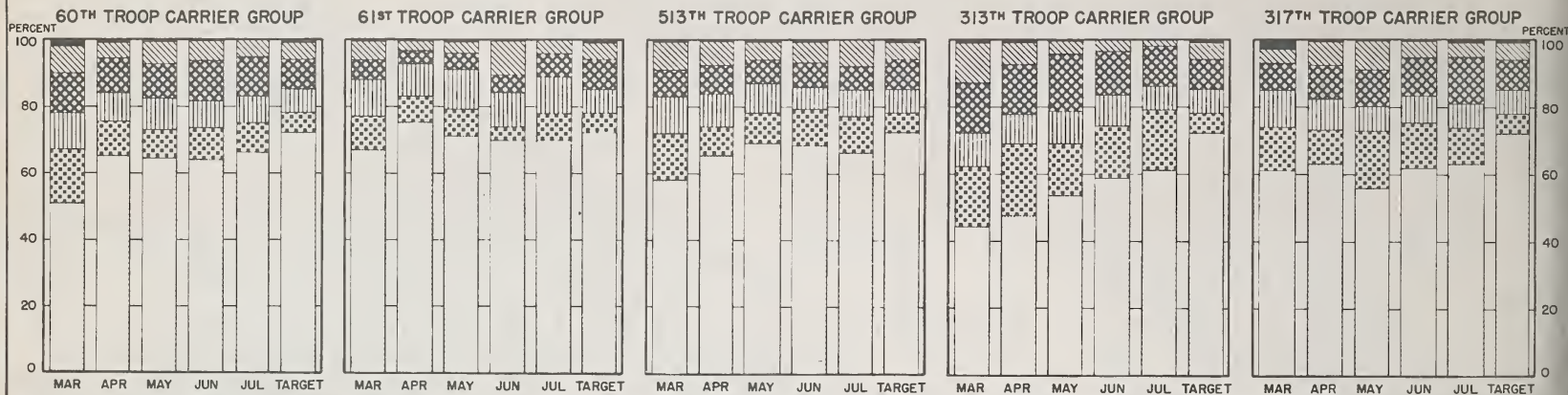
in BURTONWOOD, ENROUTE TO and FROM and ALERTED 33 ACFT.

FERRY STATUS 12 ACFT.
SAN ANTONIO POOL & HOFFETT 21 ACFT.
WITH CONTRACTORS FOR 1000 HRS.
INSPECTION 66 ACFT.

BERLIN

MAINTENANCE ANALYSIS OF C-54 AIRCRAFT

MARCH THRU JULY 1949

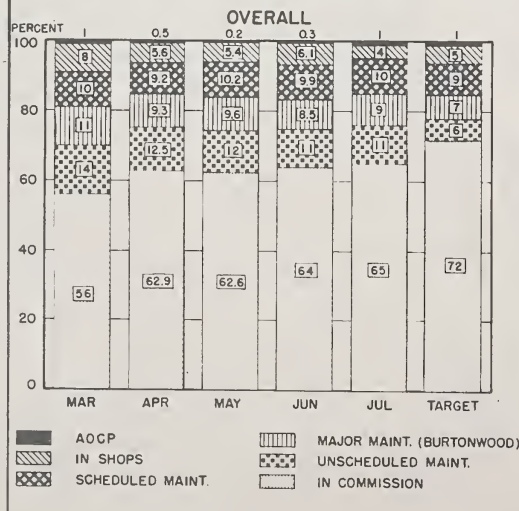


the particular aircraft was in any of the following categories:

- In Commission
- Unscheduled Maintenance
- Major Maintenance (Burtonwood)
- Scheduled Maintenance
- In Base Shops
- AOC

These forms were accumulated by groups and forwarded at the end of each month to Headquarters 1st ALTF where they were summarized, analyzed, and charted. Copies of the summary charts similar to that accompanying, showing a comparison of groups and the month-by-month picture within each group, were furnished group commanders. The latter were thus kept informed not only of the progress of their own groups but of the fleet average.

An arbitrary target of 72 percent of assigned aircraft "In Commission" was set by Headquarters CALTF. While this target was never quite reached, the five months'



NOTE:

The charts on this page are samples of the monthly studies made by Headquarters CALTF and distributed to Airlift wings. Computations are based on a local form, CALTF 10 (C-54). AF Form 110 figures reflect a slightly lower percent in commission.

summary illustrated shows that in July 1949 the average number of aircraft in commission for the fleet did reach 65 percent of those assigned. The summary chart also reflects a slight but consistent improvement in the over-all maintenance picture. From a management viewpoint, the CALTF Form 10 and subsequent analysis charts were considered well worth the time and effort devoted to their preparation and analysis.

THE ENGINE BUILD-UP LINE AT RHEIN MAIN REDUCED THE CRITICAL ENGINE SHORTAGE.

AIRCRAFT ENGINE MAINTENANCE

Engine Build-up. At the outset of the Airlift, engines were so critically short that they had to be airlifted from the ZI to Rhein/Main, at which point an engine build-up production line was established. The supply of R-2000 engines fluctuated throughout the Airlift, but it was still a source of considerable concern up to and including the final month of operation. It was evident early in the operation that although engine build-up is normally a squadron or organizational maintenance function, the rapidity with which engines were being changed and the limited spare parts available for build-up made mandatory a change in normal procedures.

One of the soundest policy decisions of the entire Airlift was made when it was decided to establish a central engine build-up line at Rhein/Main. This line handled engine build-up and tear-down for the entire operation. The system used was a production-line method, using five work stations with a sixth station for inspection. Starting with a raw engine, specific parts and accessories were added at each work station by a crew of specialists who averaged approximately 19 hours elapsed time per engine build-up. Supporting the operation was a completely equipped machine shop, a sheet metal shop, a wood working shop, and electrical and accessories shops. The engine tear-down line followed a similar work station pattern. Three men were able to disassemble an engine in approximately three hours.

ELAPSED TIME FOR ENGINE BUILD-UP AVERAGED 19 HOURS

Engine Conditioning. The acute shortage of R-2000 type engines made it necessary to take every possible measure to conserve those on hand, and under the supervision of Headquarters USAFE an engine conditioning program was established with assistance from specialists sent to Europe from AMC. Two classes in engine conditioning were conducted — one at Erding Air Depot and one at Rhein/Main. An engineering officer and two highly qualified enlisted men in every squadron in the theater were trained in each phase of engine conditioning as outlined in T. O. 02A-1-88.

It was originally planned that personnel thus trained be used as a nucleus in each squadron and that they in turn could pass on instructions to other flying and maintenance personnel of their respective squadrons. Pressure of the operation, rapid turnover of personnel, a shortage of cylinders, and lack of such equipment as Magic Wands for determining cold cylinders, top center indicators, and compression gauges seriously retarded the desired engine conditioning program.

Engine Overhaul. Engine overhaul was handled in the same manner as was aircraft overhaul; and immediately upon removal of an engine for either time or failure, it was shipped to SAAMA for standard air depot overhauling. When shipped by air, it took approximately five weeks to get an engine from Rhein/Main to the overhaul facilities at San Antonio, completely re-built, and returned to this theater.

Spark Plug Troubles. From disassembly reports, it was determined that 35 percent of engine failures experienced resulted from combustion chamber failures, 19 percent resulted from hydraulic (a liquid lock caused by collection of gasoline in the combustion chamber) and the remainder were material failures of bearings, studs, etc. Of the 35 percent of combustion chamber failures, a majority were attributed to malfunctioning spark plugs. To eliminate spark plug failures, extreme care was exercised in their handling and inspection, and various types of plugs were tried. The Airlift ended before definite factual data was obtained on the value of the various-type plugs used, but based on Navy experience and opinions from squadron engineering officers, it was generally agreed that the platinum electrode type RB-19-2 spark plug was considerably superior to the LS-88 or LS-87 type plug, for the air operation being performed.

MALFUNCTIONING SPARK PLUGS CAUSED MOST COMBUSTION CHAMBER FAILURES

ERDING AIR FORCE DEPOT COMBATTED THE SPARK PLUG PROBLEM BY REBUILDING 60,000 A MONTH

DEPOT MAINTENANCE - AIRCRAFT

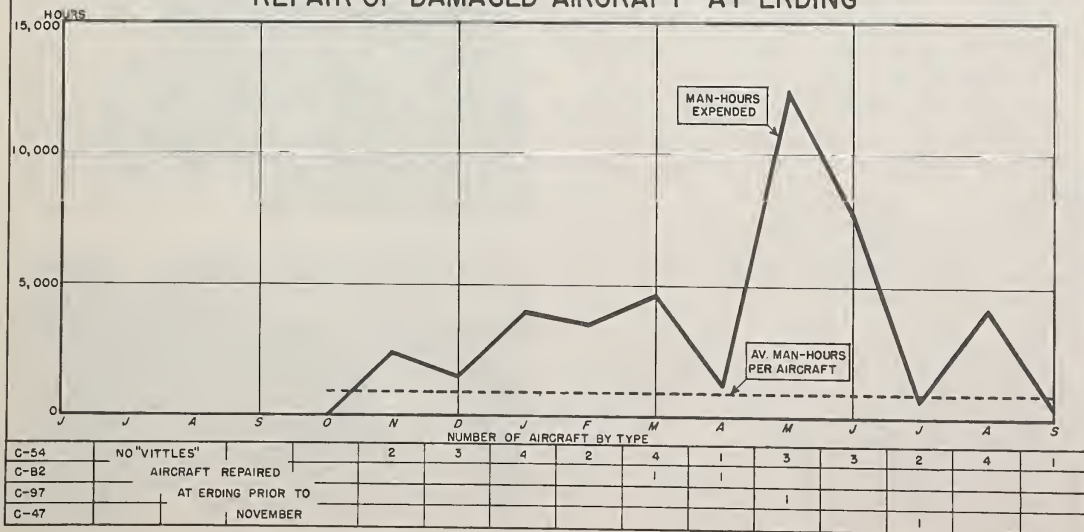
At the beginning of the Lift, 200-hour inspections were performed at Oberpfaffenhofen, an air depot located in Bavaria approximately 200 miles south of Frankfurt. In November 1948, 200-hour inspections were transferred to Burtonwood Air Base, England, which operated under control of the 3rd Air Division. With the phasing-out of Oberpfaffenhofen, Erding Air Depot remained the only depot in Continental Europe to provide logistical support for the Lift.

Normally engaged in maintenance work and production to keep the regular planes and bases of USAFE operating, Erding was given an additional workload with the advent of the Airlift. Airlift maintenance, of course, had 1-A priority, and Erding's accomplishments contributed in a great measure to the success of the Airlift operation. The types

of maintenance for which Erding shops were responsible included: welding, woodmill, blacksmith, foundry, plugs, repair of C-54 hydraulic mechanism, and repair and balancing of propellers. In addition, electrical shops repaired and returned to serviceability aircraft generators, fuel pumps, and solenoids; and carburetor and instrument shops repaired gyro instruments, flight indicators, and automatic pilot devices.

In addition to the normal depot functions at Erding, the analytical laboratory analyzed contaminated hydraulic fluid, strengths of metal found to be failing in performance, and corrosion problems both on aircraft and materiel. On many occasions it was possible to make such analyses locally instead of using the time-consuming shipment of samples to Headquarters AMC and awaiting the resulting report.

REPAIR OF DAMAGED AIRCRAFT AT ERDING



ERDING AIR BASE AIRLIFT MAINTENANCE SUPPORT

MANUFACTURE & REPAIR

	JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO	ITEMS PRO- CESSED	M/HR. EX- PENDEO
FABRICATION SECTION																														
MACHINE SHOP	1609	328	13	24	500	86	310	222	1	388	46	517	26	160	171	762	14	50	6	50				1	66	43	8			
SHEET METAL SHOP	14	244	12	799	36	510	1273	390	1	5	8	520	208	1741	51	1033	31	890	31	1193			8	516						
WELDING SHOP			10	143	60	16	6	260	510	779	3001	701	34	90			7	19	1	6										
WOODMILL	1	62					2	77	119	1687	10	1261	4	64																
PAINT, DOPE & FABRIC	21	1359	9	1125	8	990	8	1191			14	1840	8	971	13	1878	17	1160	11	362	3	527	4	78	4	279				
PLEXIGLASS SHOP	30	80																												
TANK & RADIATOR			105	379	27	57	57	406	28	1306	12	158	284	648	13	85	96	1189	46	228										
SHOPS SECTION																														
ELECTRICAL SHOP	94	668	152	1216	283	1162	161	1746	150	1201	477	3284	893	4782	494	4854	768	2688	495	3346	241	2175	29	304	266	1775				
SPARK PLUG SHOP					3000	262			20000	2491	18300	2190	38000	6359	53702	4626	40000	4130	69155	8815	36600	8259			29110	2873	10080	1507		
PROPELLER SHOP	101	1459	75	251	29	5116	35	1319	66	767	226	1735	184	2536	308	2656	42	1001	106	1162	62	2102	32	607	3188	1347	40	156		
HYDRAULIC SHOP	17	114	194	1023	211	871	60	560	2080	3503	273	1597	701	2515	441	1681	346	1209	266	1561	252	1467	110	560	502	1556	34	106		
BATTERY SHOP	56	62																												
FABRIC & LEATHER SECTION																														
PARACHUTE SHOP	53	611			34	112	203	907	3028	2016	83	202													60	293				
ASSOCIATED EQUIPMENT SECTION																														
INSTRUMENT & COMBISIGHT SHOP	292	348	165	962	642	2026	36	274	831	2900	1022	4554	1519	5366	914	2793	15	4626	550	3681	382	5469	121	427	369	3131	100	1507		
SUPERCHARGER & CARBURETOR SHOP	52	285	40	752	31	723	17	239	59	1390	538	689	62	1862	29	579	61	1317	31	1100	45	1064	25	556	93	1026	7	148		
COMMUNICATIONS SECTION																														
AIRBORNE EQUIPMENT RADIO, RADIO	10	120					36	592	7	177	978	4678	2	18	96	107	39	296	467	1474	82	449								
GRO. COMM. R & R, GCA, VHF/OF	16	279	5	179	1	300	199	700	4	17	1	276	289	1114	11	75	31	555	5	176			1	22						
TOTAL	2348	6019	796	6653	4652	10237	2647	9105	26684	18625	22969	23999	62024	26404	36245	21109	41503	19462	71156	21176	37687	19332	349	3356	33617	12108	10241	3426		

VEHICLE REPAIR

	JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO	NO. PRO- CESSED	M/HR. EX- PENDEO
PERSONNEL CARRIER, LIGHT STANDARD			1	23			1	156			1	94									4	20	4	416					1	8
PERSONNEL CARRIER, MEDIUM STANDARD																														
TRUCK 1/4 TON 4X4 G&R							1	429	3	202	6	972	10	2340	3	570	5	412	10	609	2	592	2	476	5	512	4	762	6	926
TRUCK 3/4 TON VARIOUS TYPES							3	623	1	22	8	1947	7	1224							2	371	1	246	5	634	1	406	2	871
TRUCK 1 1/2 TON VARIOUS TYPES							1	62	1	17	1	216	4	371			1	196			1	196			5	569	2	259	1	33
TRUCK 2 1/2 TON VARIOUS TYPES	1	104	15	921	24	4516	33	7211	50	2738	17	3312	18	5523	12	2618	17	3303	4	2939	15	6459	7	2416	20	3335	25	6426	10	5377
TRUCK 4-5 TON VARIOUS TYPES			2	201							6	34	2	7	4	448	5	2030	2	960	5	735	1	942	2	259	2	241	1	80
TRUCK FIRE, CLASS 153																														
TRUCK 6 TON VARIOUS TYPES			1	949	3	360																	2	2077	1	401	1	1072		
TRUCK 7 1/2 TON VARIOUS TYPES			1	17			1	6																						
TRUCK 10 TON VARIOUS TYPES																														
CRANES VARIOUS TYPES			2	37																	1	263				1	24			
TRACTOR, CRAWLER-VARIOUS											1	94							1	6	1	50	5	60	1	56	2	31	3	896
TRAILERS VARIOUS TYPES					4	626	4	490	2	60	3	260	3	97	3	305														
MATERIAL HANDLING EQUIPMENT			1	24									12	1146	3	321	2	20	1	69	4	24	1	50			2	242	1	56
GROUND POWER EQUIPMENT									9	180	9	427	3	78	10	592	33	69	7	45	3	11	8	29						
RADAR SCREEN																										1	6			
TOTAL	1	104	22	2148	32	5548	44	8979	48	3219	51	9358	57	9189	37	3052	83	8034	25	4668	37	8581	27	6712	39	3778	39	9348	20	6833

SPECIAL TOOLS AND EQUIPMENT

While personnel problems were acute in the early stages of the Airlift, the lack of special tools and equipment was critical. Hastily thrown together, temporary maintenance docks were constructed of wood on dirt foundations and were poorly lighted and inadequately heated. Attempts to use this makeshift equipment, while not primarily responsible, were considered to have contributed to the loss through fire of four aircraft undergoing maintenance. Lack of proper light and heat lowered both the efficiency and the morale of maintenance personnel. Toward the end of the Lift, plans had been made calling for masonry docks on concrete floors, and some portable steel work docks had been locally manufactured. These docks, equipped with adequate firefighting equipment, vapor-proof lighting, and adequate heating, are considered a "must" for the maintenance of any large aircraft.

The lack of washing and cleaning facilities increased maintenance problems on aircraft which carried coal and flour as principal cargo. Planes soon became filthy from coal dust and flour that filtered through floors into lower compartments. While the maintenance problems thus

created were also related to the sealing of the cargo compartment, the lack of adequate vacuum cleaners and portable washing equipment had serious results and made exacting inspections almost impossible.

The winterization of Airlift aircraft did not require as extensive winterization equipment as was required in T. O. 00-60B-1 for arctic operation. Germany is in the same latitude as the Hudson Bay region, but the climate is moderated by other factors. The winter of 1948 was unusually mild and could be compared with winter operations in Washington, D. C.

There were only about 20 sets of wing covers available for the entire fleet of 225 C-54's. AMC did not have sufficient quantities and was acting through procurement to obtain them, but it was spring by the time they arrived in Germany. In lieu of wing covers, various substitutes

were tried without success. Quartermaster burial paper was tried, but it would not stay on the wings and was very difficult to use. QM tarpaulins were shaped in six sections to fit the wings and horizontal stabilizer. They were not used because of their bulk, and analysis disclosed that they had a copper oxide impregnate that was highly corrosive to wing surfaces.

The main method of removing ice, frost, and snow was with house brooms and isopropyl alcohol. Some organizations tried such various mixtures as kerosene and



PERMANENT TYPES WERE LATER DEVELOPED AND USED



DE-ICING BY JET ENGINE PROVED TO HAVE POSSIBILITIES



TEMPORARY MAINTENANCE DOCKS WERE INADEQUATE AND DANGEROUS.

hydraulic fluid. Regulations were issued prohibiting this practice, as these oils were injurious to de-icer boots, and made the wings dangerously slippery for maintenance personnel and servicing crews. Quartermaster decontamination units were used to spray isopropyl on the wings. This procedure was fairly successful but consumed large quantities of isopropyl.

A jet de-icer unit was mounted on the back of a 6x6 truck at right angles to the chassis and operated at 40 percent power 40 feet from the aircraft. The heat generated

at this power was sufficient to warm the wing surfaces enough to remove light ice and frost. Only one of these units was tried. It was used at Tempelhof for approximately 10 hours. Although this unit was operated for only a short period, it indicated that a jet engine has promising possibilities for removal of ice and frost from aircraft surfaces.

It was a common misconception that this jet unit was used for removal of ice and snow from runways. The unit was unsuited for such use because of its weight and horizontal mounting and was never used for that purpose. On the northern zone fields, the removal of snow was accomplished by the engineers with mechanical equipment. At the southern bases the small amount of snow that fell melted after a few hours. However, because of icing conditions, sand was often needed to provide traction on runways and taxi strips.

SERVICE TESTS

After most of the original operating, maintenance, and supply problems had been solved and the Airlift became what was sometimes referred to as a "routine operation," it became a proving ground for a series of service tests of various aircraft and items of equipment. Service tests were run on a Douglas C-74 aircraft; on a Boeing C-97 aircraft; and on the Fairchild C-82 aircraft, which, incidentally, was also used throughout most of the Lift for carrying unusually bulky cargo. Because of the limited duration of the service tests on these aircraft and because of the inadequacy of logistical support, the results of the tests were not considered at all conclusive, although many valuable lessons were learned in connection with the use of each aircraft in the Airlift.

Other tests included a C-54 stripping program, the purpose of which was to increase the payload by removing from the aircraft everything except essential equipment; a cockpit instrument panel standardization program; and a tire usage study directed by Headquarters AMC. As was the case with the aircraft mentioned above, much valuable data was obtained and submitted to higher headquarters for analysis.



VALUABLE LESSONS WERE LEARNED FROM SERVICE TESTS WITH THE C-97A STRATOFREIGHTER . . .



. . . AND THE C-74 GLOBEMASTER

STATISTICAL REPORTS

When it was realized that operations might continue indefinitely, a reporting system was established and permanent statistical records and graphic charts were initiated and maintained for the duration of the Lift. The maintenance statistics thus gathered proved extremely valuable management tools. Utilized to spot unsatisfactory conditions and trends as they developed, they permitted prompt remedial action.

Data was obtained and charts were maintained daily on the following:

- (1) Aircraft in Commission (showing aircraft allocated, aircraft assigned, aircraft in commission, and percentage of assigned aircraft in commission).
- (2) Percentage of aircraft in commission by groups.
- (3) Number and percentage of aircraft undergoing 200-hour inspection.
- (4) Percentage of aircraft in scheduled and unscheduled maintenance by groups.
- (5) Times at which R-2000-9 engines failed (per engine).
- (6) Times at which R-2000-9 engines were changed for time (per engine).
- (7) Times at which R-2000-11 engines failed (per engine).
- (8) Times at which R-2000-11 engines were changed for time (per engine).

Summary Charts:

- (1) Daily Airlift engine hours (showing monthly averages and 90-day forecast).
- (2) Percentage of failures at indicated hours (per 100 engines).
- (3) Engine changes by group by month (indicating the number of changes of each type of engine for failure and the time and total changes for each group each month).



MOTORIZED EQUIPMENT MAINTENANCE

Automotive Activities. One of the unspectacular but none the less important supporting factors of the Airlift was the operation and maintenance of approximately 1,600 vehicles and 500 items of powered ground equipment used in Airlift base functions.

This equipment, plus personnel to operate and maintain it, mushroomed into being during the early months of Airlift development. In most instances it was not possible to wait to train operators or to have maintenance fully organized. The equipment had to be put into service at once. As a result, maintenance and supply activities started out with a deficit and were continually faced with an increasing workload as more equipment arrived.

The success attained in providing and maintaining transportation for the Airlift speaks highly of the effort put forth by motor pool, maintenance, and supply personnel. Only through hard work on the part of everyone was it possible to organize and develop the automotive operations along effective lines and at the same time to meet

the almost impossible transportation requirements that concurrently existed.

Facilities. With the exception of Fassberg, all of the Airlift bases had usable motor pool and maintenance facilities. Wiesbaden and Rhein/Main were most fortunate in that both bases had completed a reorganization of their motor pools and maintenance shops prior to Lift operations so that only minor changes were necessary to handle the expansion required. Celle RAF Station also had usable facilities although the motor pool and shops had to be organized and fully equipped after the site was selected. At Fassberg the facilities available for motor pool and maintenance shops were inadequate. The size and physical arrangement of buildings precluded efficient operation. This was an important factor contributing to the extreme difficulty of operating and maintaining automotive equipment at that base.

Utilization of Equipment. One transportation problem was that of trying, through improved utilization, to meet requirements without additional equipment which would require more personnel, more supplies, and more maintenance. In some instances 90 percent of certain types of vehicles were on regular daily dispatch; this left only 10 percent available for maintenance. In such a situation either the transportation could not be furnished to everyone, or scheduled maintenance could not be performed on all vehicles. The problem was never completely solved, although improvement was effected as experience was gained and the operation became more stabilized.

Personnel. It was extremely difficult to find fully qualified personnel for the motor pool and maintenance shops. In the majority of cases personnel assigned as drivers had not had adequate prior training, and because of their other duties it was not possible to give them the instructions normally considered necessary. At one of the bases approximately 10,000 operators' permits were issued during the Lift. This requirement arose through the turnover in personnel and the necessity for three-shift operation.

During early stages on the Lift there was an acute shortage of personnel. For a time maintenance personnel at Wiesbaden AB worked eight hours as mechanics and the following eight as drivers. All of the bases used German mechanics to supplement the military personnel in the maintenance shops. Approximately 50 percent of the automotive mechanics were German nationals.

Maintenance Services. The greatest difficulty in maintaining automotive equipment was that of getting vehicles to the shop for scheduled preventive maintenance services. Because of the high proportion of vehicles assigned on regular daily dispatch, it was usually impossible to provide substitutes while an assigned vehicle was in the shop; consequently, the sections having vehicles assigned were unwilling or unable to spare their vehicles for the time required to perform maintenance. In many cases sections would release a vehicle for main-

tenance only when it was actually broken down and unable to operate.

Vehicles on 24-hour dispatch for use on three shifts usually resulted in arrival of the vehicle at the dispatcher's office once a day, when the driver turned in the old trip ticket for the new one. As a result, little or no supervision could be given driver maintenance. At one base where a check was made, 15 percent of the vehicles were receiving weekly maintenance services and 40 percent were receiving monthly services. Although at first this permitted greater operational time, the long-range result was vehicle maintenance for unscheduled repairs that could have been prevented by scheduled preventive services. Within a few months this delinquency resulted in an abnormal loss of operational time and a requirement for heavier echelons of maintenance and consumption of parts which was disproportionately large.

The accompanying chart is a graphic illustration of the status of maintenance observed at the Airlift base described above.

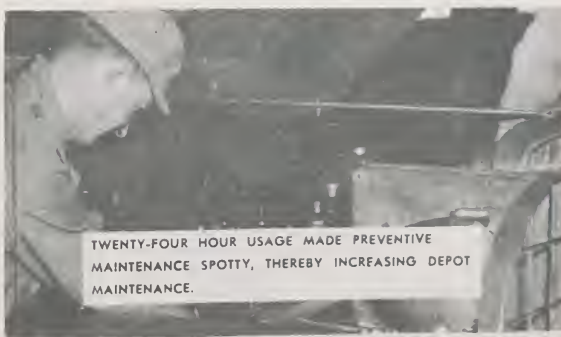
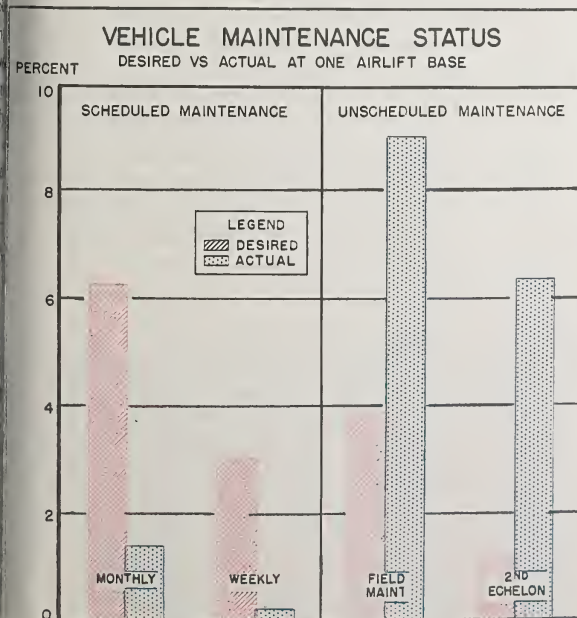
Depot Maintenance. An important factor in equipping the bases and maintaining the equipment was the program initiated by Headquarters USAF in December 1947 to arrange contracts with certain existing German plants for rebuilding Air Force vehicles and motorized equipment. Four plants were in operation when the Lift started. They were able to supply many of the requirements for Air Force special purpose vehicles and powered

ground equipment, including Cletracs, fuel servicing units, power plants, and self-contained heating units.

During the peak of operations approximately 2,000 Germans were employed at the four plants working on Air Force scheduled equipment. Certain sections of the plants worked around the clock to complete emergency requirements, among them the F-1 heaters so urgently needed to heat the aircraft maintenance nose docks during the winter months.

Phase-out of Automotive Operations. Prior to the phase-out of the Airlift detailed plans had been prepared as to turn-in and disposition of equipment. As the bases prepared vehicles and motorized equipment for turn-in, representatives of Erding Air Base inspected the equipment prior to its shipment to the depot. Surveys were required where necessary; and in this connection, it was found that all bases had an accumulation of uninitiated or incomplete surveys requiring last-minute attention.

Equipment delivered to Erding Air Base was further inspected and classified as to whether it should go directly to storage, receive further field maintenance, or be returned to Ordnance depots for rebuild. The plan for inspection by Erding Depot personnel proved to be highly satisfactory, and it was possible to evacuate vehicular equipment at each base within the specified time limit of approximately one month from the day phase-out at that base began.



ELECTRONICS AND COMMUNICATIONS MAINTENANCE

Mission. The assigned mission of this activity was to provide and maintain, on a 24-hour, 7-day-a-week basis, sufficient and adequate electronics maintenance for all USAFE electronics equipment employed directly, indirectly, or in conjunction with air navigational aids and communications facilities. In order to accomplish this mission, the following facts had to be considered:

The electronics equipment available was mostly wartime equipment which had been in storage since the end of hostilities.

The personnel that were in the theater would have to suffice until augmented by arrivals from ZI.

Aircraft to be utilized consisted mostly of C-47's, with the possibility of C-54's and/or C-82's becoming available at a future date.

Duration of the operation was unknown.

Availability of additional specialized equipment and personnel from the ZI was unknown.

General Situation. At the beginning of the Airlift, no firm staff plan based on facts could be prepared since the sole assumption was that the mission would be accomplished. To further complicate the problem of providing electronics maintenance support, the following general situation existed:

Aircraft in USAFE were not equipped with a standard radio and radar installation.

Electronics maintenance shops (organizational and

field) established in accordance with the wing base plan were in the implementing stage.

Officers in charge of USAFE radio and radar shops lacked operating and managing experience.

All USAFE electronic shops were, and continued to be, short-handed; and, of those technicians available, an evaluation (roughly estimated) pointed to the fact that their training left much to be desired.

The major percentage of electronics equipment available in stock had not been fungi- and moisture-proofed, and had been in outdoor storage since the end of the war. The original boxes, in nearly every case, had been opened for classification.

Radio compass screen rooms were not installed in any of the shops, and satisfactory instruments did not exist to calibrate the aircraft installed compasses. Test instruments and hand tools were not adequate and in most cases were unavailable. Those instruments which were on hand were of doubtful accuracy and condition.

Spare parts used with electronic devices at base level were non-existent and, in the case of depot stocks, were critically short or unserviceable.

Before the commencement of the Airlift in June 1948, USAFE electronics activities had been stretched to the limit by other unanticipated strategic requirements.

Organization. Aircraft stored at Oberpfaffenhofen and Erding were in a very bad electronic condition. They needed new cables, racks, and components thereof; in short, a retrofit, or major replacement program, for all radio equipment was necessary, requiring an estimated 3,000 manhours per aircraft. The fact that by July 1948 there were 108 C-47 aircraft assigned to the Airlift indicates the extent of demands upon electronics and communications activities.

It was necessary to "borrow" personnel to augment Airlift shops from Erding, Oberpfaffenhofen, Furstenfeldbruck, and Neubiberg. Wiesbaden Air Base had no electronics field maintenance facilities of any kind. Tempelhof in theory needed no large facilities since unserviceable equipment was to be returned to Rhein/Main. The electronics maintenance staff believed, however, that an aircraft grounded at Tempelhof without radio service would



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RADAR REPAIR WAS HANDICAPPED BY SPARE PART SHORTAGES.



MOST AIRCRAFT RADIO EQUIPMENT NEEDED MAJOR OVERHAULING

be delayed in returning to Rhein/Main or Wiesbaden if a replacement serviceable radio had to come from one of those bases. The impossibility of flying a 20-mile-wide corridor without radio aids in IFR weather was apparent, since this would constitute a potential hazard to all aircraft in the corridor. Therefore a single consolidated shop was established to take care of the organizational and field maintenance needs at Tempelhof, with orders to concentrate heavily on replacement of apparatus only.

In the beginning it was necessary to fly replacement apparatus to the Tempelhof shops and to evacuate unserviceable components. This was without question uneconomical, since incoming Airlift space was wasted; and the futility of flying extra radios 300 miles to replace a tube or a 10-cent resistor was apparent. The Tempelhof shop later expanded to the extent of having "ready teams" available at Gatow and Tegel to repair radio failures experienced by planes arriving at those bases.

Rhein/Main Air Base had the most difficult airborne electronics maintenance mission since throughout the operation more diverse missions and responsibilities were assigned to that base. Rhein/Main, for example, initially had to take care of all out-of-service radios from Tempelhof; and, at a later date, Fassberg and Celle evacuated their equipment to the field shops of Rhein/Main during the time their shops were being established. In addition, Rhein/Main was used as a terminal for material coming from the ZI, and the many aircraft used on that run obtained radio service for their equipment from the Rhein/Main shops.



MOCK-UP AND TEST EQUIPMENT WERE INADEQUATE AT ALL ECHELONS.

Operations. By 1 August 1948 the trickle of incoming maintenance personnel had increased to a small flow, but the new personnel were arriving without hand tools.

While personnel and equipment were arriving in increasing numbers, the demand for new nav-aids, telephones, radios, and radar equipment was increasing at a much higher rate. Any increase in flying operational demands invariably results in establishment of large complex telecommunication nets. Men and materiel had to be provided to install, operate, and maintain these nets.

With the activation of Headquarters 1st ALTF, much of the staff load was removed from the Electronics Maintenance Section of USAFE. It was apparent, however, that although Headquarters 1st ALTF had an Electronics Maintenance Section, the critical personnel situation at base shops would not be changed. The equipment situation was partially relieved by the arrival of spare parts from the ZI. Records indicate that the electronics shops of USAFE had to effect approximately 50 AN/ARC-3 retrofit installations in Airlift C-54's which had arrived without eight-channel equipment installed. Every shop and organization was provided spare components for mock-ups and replacement purposes from the USAFE retrofit stocks. This meant that the equipment was denied other tactical aircraft of USAFE. It was absolutely necessary to have eight-channel VHF in Airlift aircraft. In fact, by the end of the operation a project to "double" the channels by the addition of another VHF radio had become necessary.

By October 1948 the operation had somewhat stabilized, permitting shops to commence planning for a "long pull." It was still evident that test equipment, hand tools, and mock-ups were inadequate at all echelons; and a concentrated effort was made to standardize all shops, both organizational and field, to a bare operating-minimum equipment level.

During this same period great pressure was put on "cleaning up" the C-54 radio and radar shortcomings. However, this proved difficult because of the almost continuous operation of each aircraft.

It first was noticed in October that the seepage of

hydraulic fluid, coal, and flour was causing considerable damage to the radio and radar equipment. By the end of the Airlift many C-54 aircraft were in need of complete electrical re-cabling.

From October to the end of the Lift, electronics maintenance was plagued with serious operational problems due to tool shortage, test equipment shortage, spare parts shortage, and most important, an ever-short supply of trained personnel. This lack of training of maintenance personnel was partially relieved by the assignment of Philco technical representatives to the various shops and organizations. Their services would have been unnecessary, had the level of training of the military technicians been equivalent to that of the late war; however, under existing circumstances the mission of maintenance could not have been performed without them.

Additional Electronics Missions. Little has been said in regard to the Navigation Aids - GCA, ILS, beacons, etc. — since this equipment was primarily the assigned responsibility of AACS for installation, operation, and field maintenance. However, 50 percent of all work in the depot area was devoted to assisting AACS in the performance of their mission. This work in general paralleled that of the USAFE air maintenance shops, but was mainly performed by personnel of mobile depot teams. An organization such as the 11th Communications Maintenance Organization, due to the high mobility and equipment provided by their T/O&E (1-1010), was the one type which could be used to "fill a gap" on an overnight basis. While the primary mission of these teams is maintenance, the



ADDITIONAL TRAINED PERSONNEL WERE NEEDED



thousands of supply items delivered by them contributed materially in keeping the navigation aids and communications devices operating. Due to the acute shortage of spare parts for power units, it was necessary in 187 recorded cases for a team to deliver a power unit from the depot, effect an installation, pick up the old unit, and return it to the depot rebuild plant for manufacturing of the parts and repair. The situation on power units was so desperate that at times there was no apparent source of units for the next week's demands. On one occasion, power units of 3,000 pounds were airlifted from the ZI.

Evaluation of Operations. During the course of the Airlift every available man, tool, and instrument was utilized to the utmost. Two factors permitted the accomplishment of the mission of electronics maintenance.

The factor of "over-design" built into every American radar and radio was one. The ability of the USAF equipment to take abuse day after day with low-caliber maintenance was a "plus" factor which kept the requirements of repair to a minimum and permitted a few men to do a big job.

The other factor was relatively mild temperatures experienced in Europe during the winter of 1948. The absence of heavy snow, ice, and freezing cold permitted

a high productive level of maintenance. Fortunately, all electronics maintenance work at air bases and at beacon and radio stations was possible in indoor areas.

Comments and Suggestions. The electronics maintenance personnel available, both officer and enlisted, were not up to standard. Few officers of MOS 4415 or 4402 were experienced in shop organization or management. No officers assigned were in possession of engineering degrees. Enlisted personnel in most cases were new to electronics maintenance or had a low experience level.

The shortage of test apparatus, tools, and mock-ups was an ever-present problem. At the end of the Airlift these shortages still prevailed and continued to be a source of unsatisfactory electronics maintenance. One of the most difficult problems encountered was the repair and calibration of electronics instruments. This work required skilled technicians and "secondary standards" which were not available in USAFE, since wing-type depots had no provisions in their T/O&E's for this type of work. Tactical overseas depots must be provided with an electronics instrument repair shop, since the test equipment used to calibrate all electronics devices used by the Air Force is dependent on these instruments for their accuracy.

The shortage of spare parts during the Airlift was a problem of great magnitude. This was due to many factors, among which were failure of maintenance and supply personnel to comply with AF Manual 67-1; lack of understanding of Technical Orders of the 00-30A Series; unusually high attrition rates due to increased hours of operation during the Airlift and to the "seepage" of the material into the electronic equipment; and lack of AF stock numbers on many parts used in airborne equipment, most parts used in ground equipment, and all parts used in preproduction models.

Shortages were experienced in Technical Orders, TM's, and maintenance publications of all types. TOC's and MWO's were not complied with because of non-receipt of publications. Standard publications had to be obtained by air mail from the Air Materiel Command and in numerous instances were reproduced locally in order to meet the operational needs of electronics shops throughout the command.



Deviation from Standard Procedures. The occasional necessity of "jumping channels" to provide special equipment in the course of a new type operation is recognized. It is nevertheless believed that more time was lost and confusion caused by going out of channels than if established channels had been used. For example:

The AN/CPS-5 was delivered direct to Berlin by air. It is not generally known that this set was short much of the equipment needed to operate an effective control center, and that the tower plotting equipment and telephone switchboard had to be provided from the theater AF depot. The resupply of items to maintain this set in operation was rendered extremely difficult because all shipping documents and stock lists were lost.

The AN/CPN-4 and the Visual Aural Range were delivered in a similar manner, and the logistical support mission was extremely difficult because of many lost documents and supplies.

The introduction of new equipment into a theater should be primarily a depot responsibility during the early phases, in order to permit computation of requirements before the equipment is installed. The depot is the sole organization with sufficient logistical personnel to meet all requirements of installing new equipment and computing requirements.

AIR INSTALLATIONS



GENERAL

The Air Engineer, as a staff officer, was responsible for the normal staff functions pertaining to repairs and utilities and new construction at USAFE air bases. At no installation was the organization of the installations office set up in contemplation of large-scale emergency construction.

Rhein/Main, which was the major civil air terminal in Germany, had been built principally by USAFE, and its meager facilities were already badly overloaded. This base was known to those familiar with it as "Rhein-Mud." The pseudonym was not inapt. Wiesbaden Air Base was a former Luftwaffe fighter base and was in use for USAFE Headquarters administrative flying. Minimum facilities and utilities were existent. Tempelhof Air Base had one recently completed pierced steel planking (PSP) runway and a confusion of badly bombed facilities. It was then in use by one flight of a special missions group flying OMGUS personnel.

The requirements immediately imposed by the Airlift for numerous construction jobs, each a "priority one" project, necessitated overall augmentation of personnel strength in

all categories. The main difficulty encountered, a shortage of certain specialists, was largely obviated by use of German skilled workers and technicians.

The problems encountered were, of course, manifold. The urgent necessity for new construction resulted, through sheer lack of manpower and equipment, in a tendency to neglect the also urgent necessity for maintenance of existing facilities. Shortages of general classes of materials and specific critical items made necessary many expedients and substitutions not acceptable under ordinary conditions.

The housing situation presented an extremely troublesome problem. Existing buildings at all bases were renovated as rapidly as scarcity of materials and shortage of manpower permitted. No space was overlooked from attic to basement. Winterized tents, Nissen huts, and wooden prefabricated huts were utilized to the extent of availability. The whole problem was further complicated due to the highly inadequate existing sanitary facilities. Construction of adequate military housing accommodations was given the highest priority, and this work was pushed to the fullest extent possible. Projects were also initiated for additional

dependent housing in Wiesbaden, Rhein/Main, Celle, and Fassberg. These difficulties, and many more, were eventually resolved; and as all of the airfields available to USAFE both in Berlin and in the American zone of Germany were inadequate, large scale, rapid construction was undertaken. The principal projects, together with pertinent data, are as follows:

TEMPELHOF

Tempelhof Air Base in Berlin — initially the terminal for all USAFE planes — originally had a single PSP runway 6,150'x150', with dispersed hardstands for tactical type aircraft, necessary connecting taxiways, and an apron of concrete block construction. The lift tonnage requirements made it readily apparent that additional facilities were required.

Accordingly, there was designed and constructed at Tempelhof, parallel to the existing runway, a new south runway of 18" compacted brick rubble, 5,750'x140' with PSP and PAP (pierced aluminum planking) surface over asphalt. An additional runway, of similar construction but with a heavier asphalt surface and without PSP, was constructed to the north of the existing runway. All of this was performed without interference to the operation; and concurrently, intensive maintenance was performed on the original runway. Requirements were as follows.

South Runway:

Excavation . . .	60,000 cy (cubic yards)
Flexible base . . .	45,000 cy
Topping stone . . .	10,000 cy
Asphalt	275,000 gal
PSP and PAP . . .	800,000 sq. ft.

North Runway:

Excavation	95,000 cy
Flexible base	100,000 cy
Topping stone	16,000 cy
Asphalt	450,000 gal
Manhours expended	540,000
Cost	3,030,000 DM (Deutsche Marks)



TEGEL

A site in the French Sector of Berlin on a loam Wehrmacht tank training area, now known as "Tegel Airfield," was selected for a new airfield on 5 August 1948. Completion in six months was the target set. The first plane landed at Tegel three months after the first bulldozer moved in, and the field was operational one month later.

During the above period of four months, the following construction was accomplished:

5,500'x150' of 18" compact brick rubble, asphalt surface. 1,120,000 sq. ft. of apron, 6,020' taxiways, 50' to 100' in width, all of similar construction. 3,200' of 40' access road and 1,200' of 20' access road were constructed, as well as 2,750' of access railroad. In addition were constructed an

administration and operations building, a control tower with complete facilities, a fire station, an infirmary, a transportation building, and GCA hardstands and facilities. Runway and taxiway requirements were as follows:

Excavation	1,225,000 cy
Flexible base	250,000 cy
Topping stone	30,000 cy
Asphalt	900,000 gal
Manhours expended	9,029,560
Cost	17,879,218 DM (Deutsche Marks)

In addition to the above, a second runway capable of supporting C-74's was later constructed at Tegel at a more leisurely pace.



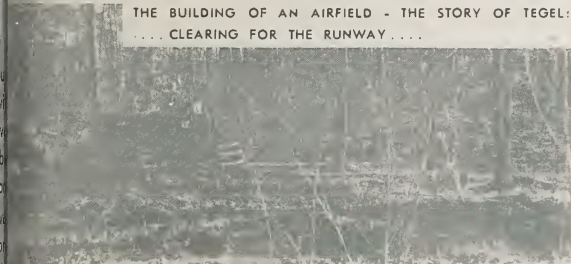
... IN FULL OPERATION - 4 MONTHS AFTER BEGINNING AND 2 MONTHS AHEAD OF SCHEDULE.



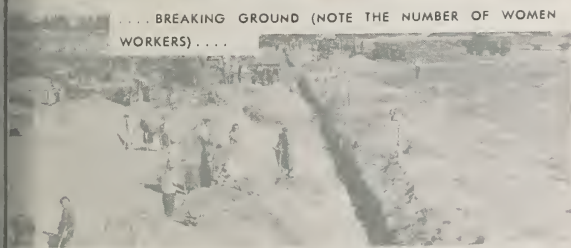
FROM THE AIR, THE FINISHED AIRFIELD LOOKED LIKE THIS.



THE BUILDING OF AN AIRFIELD - THE STORY OF TEGEL:
... CLEARING FOR THE RUNWAY ...



... BREAKING GROUND (NOTE THE NUMBER OF WOMEN WORKERS) ...



... SPREADING RUBBLE FOR THE RUNWAY BASE ...



... GRADING AND TERMINAL CONSTRUCTION ...



... ADDING TOP STONE ...



... STILL UNDER CONSTRUCTION - BUT OPERATIONAL!



RHEIN/MAIN AIR BASE

There existed at Rhein/Main one 8" concrete runway 6,000'x150' with dispersed hardstand for tactical type aircraft. It was urgently necessary to expand the meager facilities as rapidly as possible, with all construction suited to the design requirements of C-54 type aircraft. The following construction projects were initiated and pushed to an early completion:

PSP hardstand - 850,000 sq. ft.

20' graveled roads - 19,900'.

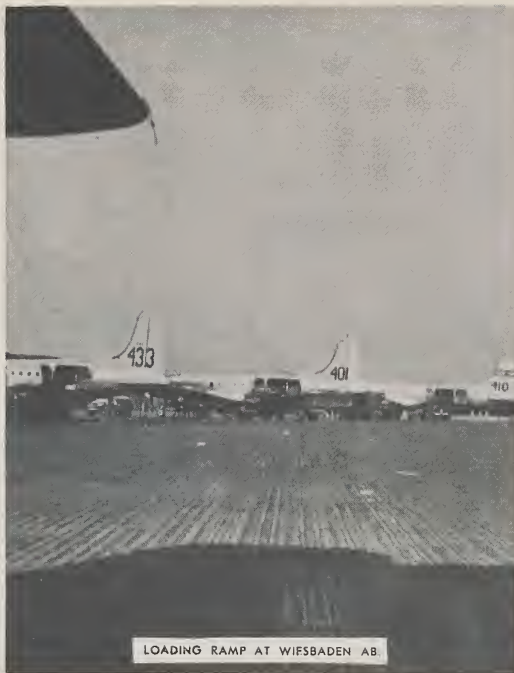
PSP parking aprons - 330,980'.

50' PSP taxiway - 4,638'.

Central aircraft loading ramp - 1,250,000 sq. ft.



CONSTRUCTION AT RHEIN/MAIN AB.



LOADING RAMP AT WIESBADEN AB.

WIESBADEN AIR BASE

When operation opened from Wiesbaden Air Base there was in existence a single 8" concrete runway 5,500'x120', with similar hardstands and taxiways. The following construction was accomplished at this base during simultaneous construction at other bases:

Runway extension 1,500'x120' - 8" concrete.

37' additional hardstands - 5,620,220 sq. ft.

PSP aprons - 593,300 sq. ft.

50' concrete taxiway - 2,435'.

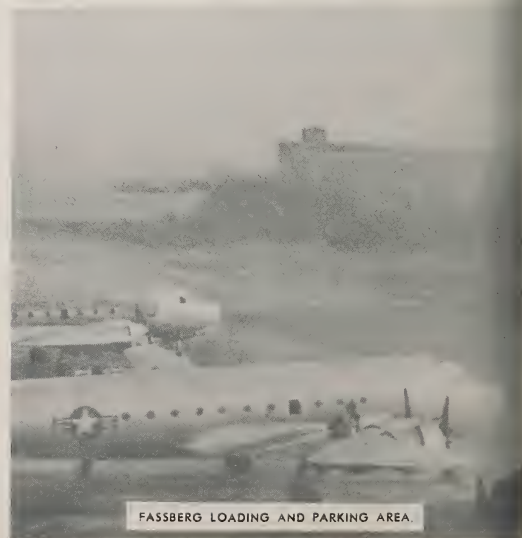
40' PSP taxiway - 1,586'.

120' PSP overrun - 2,000'.

25' concrete access road - 4,760'.

CELLE AND FASSBERG

Fassberg had a new concrete runway, 6,000'x150', and the facilities there were expanded by the provision of a loading apron, 1,500,000 sq. ft. in area. This work involved the excavation and movement of 41,000 cu. yds. of dirt, the application of 70,000 tons of gravel, and the placing of 120,000 panels of PSP. At Celle the following facilities were constructed in approximately three months' time: 5,400'x150' runway with a Telford base, asphalt surfaced; 1,980,999 sq. ft. of PSP-covered loading apron; and 9,500'x50' of PSP-covered taxiway. This involved the excavation and movement of 99,000 cu. yds. of dirt, placing and compaction of 177,000 tons of stone, and the application of 520,000 gallons of asphalt. Intensive maintenance of existing facilities, construction of additional quarters, expansion of water, sewage and electrical facilities, additional technical facilities, flood lighting, etc., is not included in the list of major projects at any of the USAFE bases.



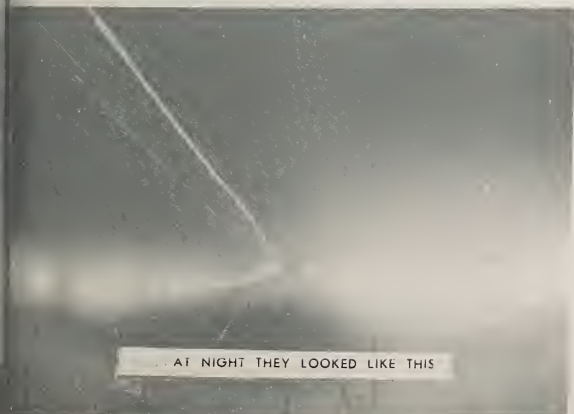
FASSBERG LOADING AND PARKING AREA.

APPROACH LIGHTING

It was soon apparent that, in order to maintain constant deliveries of adequate tonnage into the blockaded sector, it would be necessary to supplement existing GCA equipment with additional landing aids, the most important of which was the installation of high intensity approach and runway lights. Conferences between appropriate Headquarters 1st ALTF and installations officers established the



HIGH-INTENSITY APPROACH LIGHTS, LIKE THESE AT TEMPELHOF, WERE INVALUABLE AIDS....



AT NIGHT THEY LOOKED LIKE THIS

priority and importance of installation as Tempelhof, Rhein/Main, Tegel, Fassberg, Celle, Wiesbaden, Gatow, and Burtonwood, in that order. A table of the consequent construction projects follows.

AIR BASE AND TYPE EQUIPMENT	INSTALLATION	
	BEGAN	FINISHED
<u>Tempelhof Air Base:</u>		
D-2 Approach Lights	28 Oct 48	1 Apr 49
Krypton Flash Beacons		
Center Runway	1 Apr 49	28 Apr 49
South Runway	1 Jun 49	30 Jun 49
<u>Rhein/Main Air Base:</u>		
D-2 Approach Lights	27 Nov 48	29 Jan 49
Krypton Flash Beacons	2 Mar 48	15 Apr 49
<u>Tegel Air Base:</u>		
D-2 Approach Lights		
North Runway	21 Dec 48	13 Mar 49
South Runway	7 Jul 49	1 Sep 49
Krypton Flash Beacons		
North Runway	4 Mar 49	30 Apr 49
South Runway	7 Jul 49	1 Sep 49
<u>Fassberg RAF Station:</u>		
D-2 Approach Lights	22 Dec 48	1 Mar 49
<u>Wiesbaden Air Base:</u>		
D-2 Approach Lights	1 Mar 49	9 Apr 49
Krypton Flash Beacons	15 Apr 49	4 May 49
<u>Burtonwood Air Base:</u>		
D-2 Approach Lights	1 Aug 49	15 Nov 49
Construction by British; supplies and technical advice by U. S.		
Note: Celle and Gatow RAF Stations were installed with British Calvert Bar System Approach Lights.		

Runways at ALTF bases were all equipped with D-1 runway lights. They proved highly satisfactory.

GENERAL COMMENT ON LIGHTING

It is generally conceded that the installation of high intensity D-2 approach lights in conjunction with GCA was an invaluable aid in accomplishing landings under adverse conditions.

All towers for high intensity D-2 approach lights were fabricated from PSP landing mat and have proved highly satisfactory.

Some trouble was encountered in the regulation of intensity of approach lights, as there was no provision for control from the tower; rather, control was manual by regulation of the generator voltage in accordance with instructions from tower operators. Quite frequently confusion resulted when German generator operators misinterpreted tower instructions.

A unique construction problem was encountered in the installation of towers for the D-2 approach lights at Tempelhof Air Base, as it was necessary to make practically the entire installation in a cemetery. Since the outermost towers were approximately 70 feet in height, the removal of several bodies was necessary to get adequate depth for footage. To avoid grave stones, trees, and shrubbery, it was also necessary to dig cable trenches in a zigzag manner. This slowed construction somewhat, but all problems were satisfactorily solved.

CONCLUSIONS

The only material available in Berlin for construction of base courses for runways was brick rubble. There was no experience background for use of this material, and soil testing kits were not available, but it was found that properly compacted and surfaced with asphalt and PSP, the rubble gave excellent results. When sufficient asphalt became available for laying an adequate asphalt surface course, it became possible to eliminate the PSP.

Engineering heavy equipment was disassembled and loaded in planes for air shipment to Berlin largely in accordance with the package breakdown given in TB (Technical Bulletin) Eng 33B. There were, however, several im-

portant exceptions. Fewer cuts and rewelds than indicated in TB 33B were necessary, as outlined below:

- (1) Rock crusher jaw assemblies were disassembled when shipped by C-54 but were left intact when shipped in C-74's. This constituted a great saving in time and manpower.
- (2) When C-82 aircraft were available, the tandem drives (together with the transmission and final drive) on Gallion graders could be left intact.
- (3) Large items such as grader chassis and crushing and screening plant frames were loaded into the C-74 without cutting. However, these items proved much too heavy for the elevator equipment, with resultant damage to component elevator parts.
- (4) There was one important exception to cutting procedures described in TB 33B. All cuts across box-girder sections were straight on the sides and V-shaped on top and bottom instead of straight cuts all around as shown in the TB. The V-cuts eliminated the need for using templates or center punch measurements for alignment during re-assembly and made it possible to align all welds using nothing more than a carpenter's square and spacing bars of 3/8" steel rods. Much time and labor was saved by this method.
- (5) The C-82 was extremely useful due to the open-end fuselage, which during this operation was used with the rear doors removed. Large items could thus be loaded with a minimum of dis-

assembly. The five-ton maximum pay load was, however, a definite disadvantage. The average loading time and capacity of each type of aircraft in moving heavy Engineer equipment to Berlin were:

AIRCRAFT	AVERAGES	
	LOADING TIME	TONNAGE
C - 47	2 hours	3
C - 54	2 1/2 "	9
C 74	2 1/2 "	19
C - 82	1 1/4 "	5

There was a tremendous necessity for rapid expansion of facilities and utilities of all types — cargo storage, roads, ramps, wash racks, water, sewage, electric power, Av-gas storage, maintenance docks, etc. Each presented problems of an individual nature; however, from an engineering viewpoint these problems were not new, and no new methods of a helpful nature were developed. It is noted that temporary nose docks of wood construction were proved unsatisfactory. If at all possible, masonry or steel framework docks should be used.

Approximately 81 flights from Rhein/Main to Berlin were made by C-97 and C-74 aircraft. These flights terminated at Gatow and Tegel. In addition, from two to four flights a week were made by C-74's and C-97's from Rhein/Main

to Westover. The runway at Tegel, designed for C-74's, was not damaged by the use of these aircraft. However, the result of using aircraft heavier than those for which other runways were designed was nearly disastrous. Within four or five weeks the concrete runway at Gatow was so broken and damaged that it was temporarily out of use. This runway was closed and a four-inch asphaltic concrete overlay was applied. Through intensive maintenance, it was possible to keep the runway at Rhein/Main open to traffic; however, the deterioration was so marked that construction of an additional runway designed for the heaviest existing types of aircraft became necessary. Construction was started in July 1949 and was completed in November.

Phasing-out presented no particular difficulties of an engineering nature. Runway and field lighting was removed from some of the Airlift bases which were not in the U. S. zone. Several construction projects designed exclusively for Airlift needs were cancelled. The second runway at Rhein/Main was continued because the need for it was not dependent upon the Airlift.

On the whole, problems encountered by the air installations officer were unusual only in scope and time limitations. The shortage of construction materials in Germany was a serious problem and was troublesome throughout the operation. This lack was more evident in the construction of housing and technical facilities than in heavier construction of runways, parking aprons, and taxiways. No ready-made solution to this problem ever became evident. Each shortage or complete lack of a given item had to be considered individually and circumvented through substitution or redesign.

In the construction of runways, taxiways, and aprons, it became clearly evident that for an operation involving continued use by a large number of heavily loaded aircraft, under-design is false economy at its worst. Existing runways failed rapidly when overloaded. Once a runway or other paved surface had been extensively damaged, the cost of repairs equaled the cost of a new runway. It was further noted that pierced aluminum planking failed badly under heavy usage and was much inferior to steel planking for long-time use.

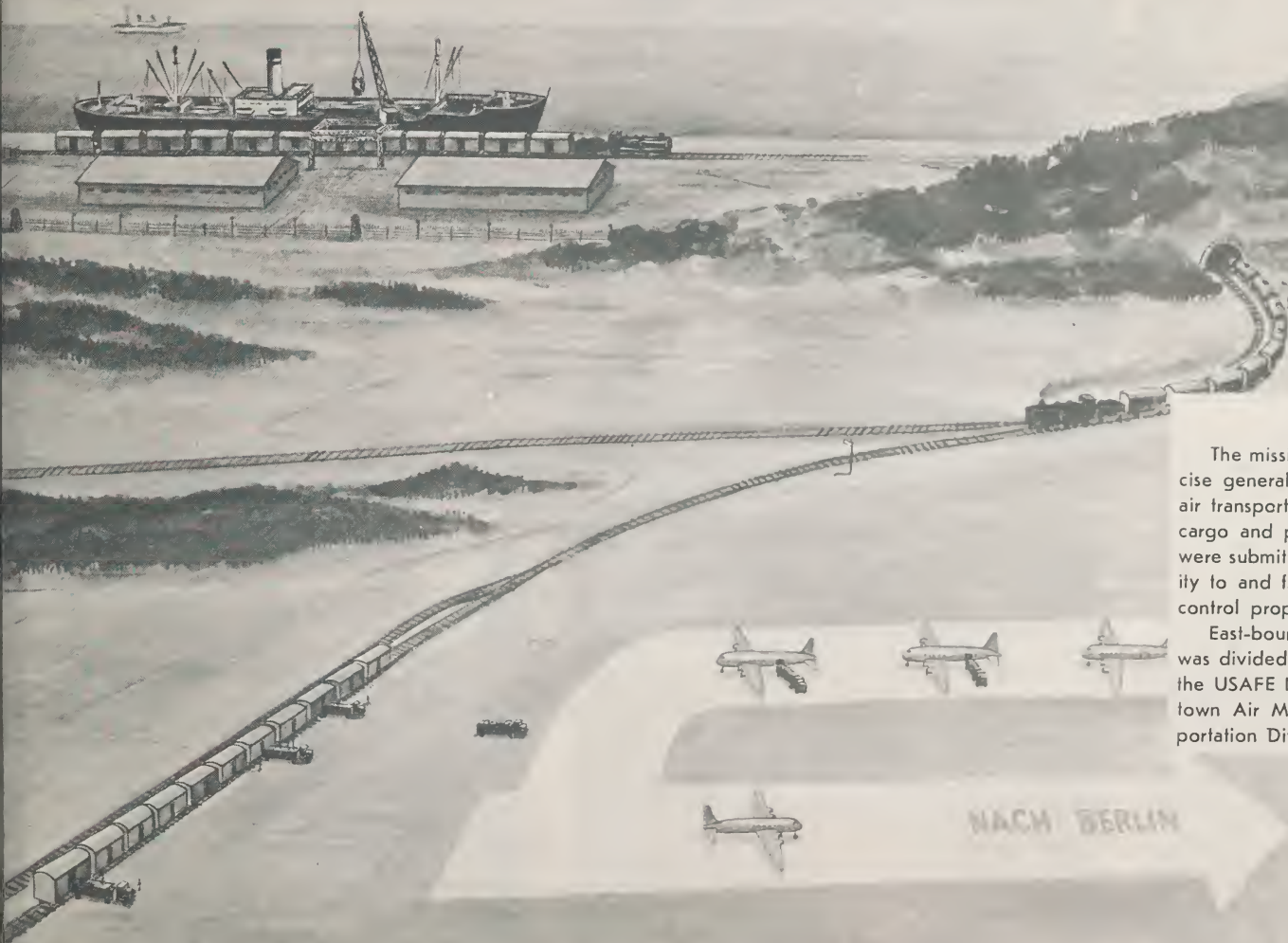


ENGINEER HEAVY EQUIPMENT AWAITING LOADING FOR AIR SHIPMENT TO BERLIN



. . . . AND HOW IT WAS LOADED.

TRANSPORTATION



MISSION

The mission of the Transportation Division was to exercise general supervision over the use of rail, water, and air transportation pertinent to movement of all Air Force cargo and personnel. Through this activity, requirements were submitted to Headquarters USAF for air cargo capacity to and from the ZI, and air priorities were issued to control proper utilization of that capacity.

East-bound air freight in support of Operation "Vittles" was divided into two parts; the first was administered by the USAF Liaison Office at the Headquarters of Middletown Air Materiel Area, and the second by the Transportation Division, Headquarters USAF.

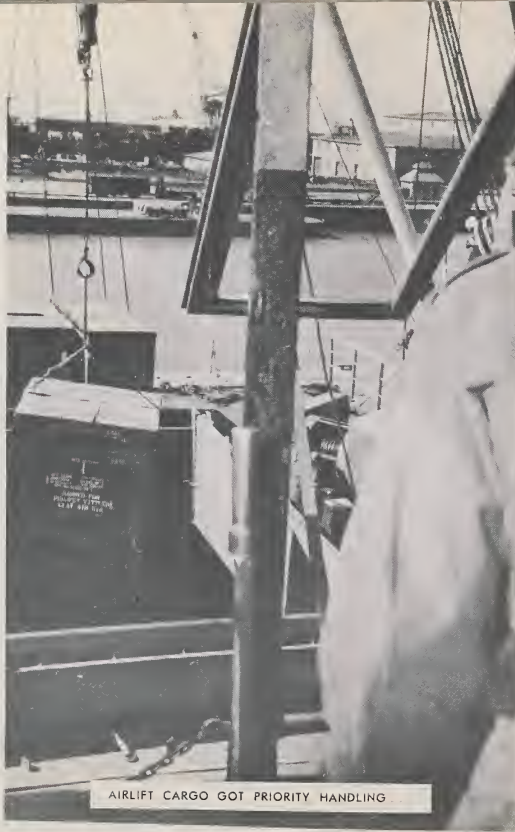
ORGANIZATION

The east-bound air allocation in June 1948 was 35,000 pounds per month. All of this weight was controlled at MAAMA. East-bound air cargo traffic during the Airlift increased to the point where the USAFE Liaison Officer controlled 100,000 pounds per month, and the reserve band controlled by Headquarters USAF amounted to 700,000 pounds per month. This cargo was transported by Vittles aircraft returning from cycle reconditioning and by regularly scheduled C-54 and C-74 type MATS aircraft. The phase-out reduced east-bound tonnage to pre-Airlift requirements.

Prior to the operation, west-bound air cargo traffic consisted of air space allocation of 20,000 pounds per month. Due to support of the Airlift this traffic increased to a monthly average of 600,000 pounds. During the peak month, 750,000 pounds of air cargo were moved west-bound on Vittles aircraft returning to the ZI for cycle reconditioning and on regularly scheduled MATS aircraft.

To supplement air transportation, there was established an ocean service known as "MARINEX." All supplies indicated as "MARINEX" shipments were accorded priority handling and shipment in the ZI to the New York Port of Embarkation, top stowed on fast U. S. Army transports and U. S. commercial flag ships for first offloading at the Bremerhaven Port of Embarkation, and from there were

USAF ALLOCATION OF AIR CARGO FROM THE UNITED STATES
INCREASED TO 800,000 POUNDS A MONTH.



shipped to their destination by the fastest available surface means. As originally established in September 1948, this express service was for east-bound traffic only, but was made applicable to west-bound traffic in December.

The Transportation Division coordinated and expedited movements of freight, dependents, baggage, and privately-owned vehicles within the theater as well as to and from the Bremerhaven Port of Embarkation. Constant liaison with the EUCOM Chief of Transportation, the EUCOM Air Priorities Board, and USAFE base transportation officers assured complete coordination.

EARLY PLANNING

A brief review of the operations background will illustrate the necessity for the coordination required. That coordination is illustrated in EUCOM's report on the Berlin Airlift which states:

"Basic planning during the spring of 1948 revealed that S-4 staff members at Berlin had been long aware of the precarious status of rail supply for the military forces at Berlin. Intensive planning was undertaken in February and May 1948 to foresee emergency requirements in the event that air supply became necessary - - - -."

Some of the early planning included such plans as:

- "(1) USAFE will provide necessary aircraft and crews.
- (2) The Chief of Transportation, EUCOM, will re-establish TCP (Traffic Control Point) at Rhein/Main Air Base.
- (3) All technical services will furnish the Chief of Transportation quantities, including weight and cubage, to be shipped to fill Berlin requisitions. The Chief of Transportation will call on technical services to ship supplies to Rhein/Main as required."

The first blockade was imposed on ground transporta-

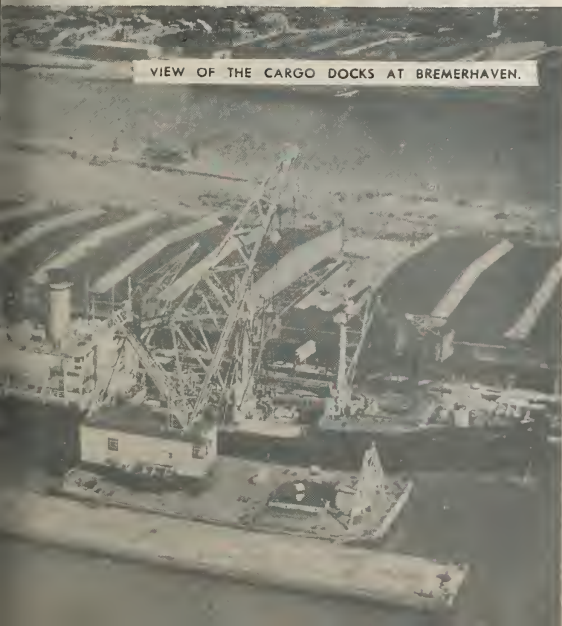
ALL ALONG THE LINE.



tion to and from Berlin from 1 April to 11 April 1948. Even though the Airlift during this period was almost too small to mention when compared with Operation "Vittles," it provided valuable experience for the occupation forces. One of the principles which later proved invaluable was that of central clearance of cargo, which was the basis for later organization of a single agency at Berlin to establish cargo priority.

The Transportation Corps decided in April 1948 to operate its airhead transportation on a shuttle basis, with loaded trailers parked where they could be drawn in, as needed, to load the planes. The general lines of responsibility established in the April venture remained the backbone of transportation plans for the subsequent Lift.

To prepare for a future emergency, the period between April and June 1948 was used to build up stock levels at Berlin and to ship out personnel and supplies due for evacuation; for example, military coal shipments to Berlin were increased from 67 carloads in March to 638 carloads in April.



VIEW OF THE CARGO DOCKS AT BREMERHAVEN.

AIRLIFT OPERATIONS

Transportation service at all USAFE bases participating in the Airlift was generally performed by expansion of existing facilities rather than by addition of new services. In all cases the expanded operation was performed with very slight increases in personnel. The number of personnel assigned to the staff office of the Transportation Division, Headquarters USAFE, did not increase although the volume of the workload multiplied. Erding Air Depot increased all classes of personnel 15 percent when a Central Receiving and Shipping Section was established there.

During March 1949 the Transportation Section of Rhein/Main Air Base acquired an additional responsibility with the consolidation of receiving and shipping. To prevent a demurrage on critically short freight cars, the new section was made directly responsible for expediting the loading and unloading of all rail cars.

The attached table shows the gradual upward trend of cargo handled at Wiesbaden Air Base, Rhein/Main Air Base, Erding Air Depot, and Furstenfeldbruck Air Base and the gradual downward trend as the phase-out was near-



A BOATLOAD OF PERISHABLE FOODS FOR BERLIN.

ing completion in September 1949. These tonnages represent materials and supplies transported to Airlift bases by truck in support of Operation "Vittles." They do not reflect food, fuels, and other materials actually airlifted into Berlin for support of the German economy. Wiesbaden is a typical example of the trend changes. Rhein/Main Air Base and Erding Air Depot reveal a high constant loading and unloading trend for August and September 1949 because of their acceptance of phase-out cargo from Celle and Fassberg. Furstenfeldbruck Air Base shows a rather spasmodic and irregular trend, as an example of an air base which did not participate directly in the Airlift.

CONCLUSION

The Transportation problems posed by the Airlift were not new; their change was only in degree. The pre-Lift policies, procedures, and techniques in this field operated adequately and efficiently with no major changes.



OFF-LOADING TO RAILWAY CARS

RAIL FREIGHT RECEIVED VS SHIPPED

BASE	ITEM	JUN 48	JUL	AUG	SEP	OCT	NOV	DEC	JAN 49	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
ERDING AIR DEPOT	TONS RECEIVED	4050	4766	7436	5354	7790	6775	6646	6184	7230	5184	6401	7101	7648	7018	7902	8982
	CARS RECEIVED	597	712	758	427	582	571	649	724	515	583	730	754	785	748	888	1026
	TONS SHIPPED	1684	4432	5885	3690	7028	3098	3157	2778	2360	2664	2067	2211	1886	2365	1977	1771
	CARS SHIPPED	186	438	654	490	769	386	342	416	335	415	350	338	298	318	341	240
WIESBADEN AIR BASE	TONS RECEIVED	9350	20980	30923	25288	26544	25082	23965	13470	14180	12100	23150	25200	24480	22404	13104	8330
	CARS RECEIVED	523	1165	1720	1410	1470	1395	1360	745	784	673	1281	1401	1361	1242	729	463
	TONS SHIPPED	377	1772	1196	2464	882	1382	938	840	1058	1948	666	2372	1504	1242	556	737
	CARS SHIPPED	21	99	67	137	49	77	51	47	59	110	37	132	84	69	31	46
RHEIN/MAIN AIR BASE	TONS RECEIVED	9828	46908	49020	92000	90750	85300	56115	99792	117560	129900	123658	118122	108354	134614	63290	54000
	CARS RECEIVED	546	2606	3482	4600	4202	4265	4444	5544	5878	7220	7274	6818	5853	6923	3520	2700
	TONS SHIPPED	1080	31086	4176	7600	7360	7500	6380	6003	6850	7354	5780	5986	6146	8334	7606	4640
	CARS SHIPPED	60	1727	232	384	368	236	319	305	341	353	340	348	342	463	347	232
FURSTENFELDBRUCK AIR BASE	TONS RECEIVED	3143	7817	5371	5868	4677	5554	5627	3988	4915	8612	8019	4805	4767	3376	4426	4351
	CARS RECEIVED	165	514	461	356	300	373	275	271	320	546	547	309	281	218	262	228
	TONS SHIPPED	442	1268	1002	449	226	700	450	407	432	54	441	1448	1873	1300	1384	1038
	CARS SHIPPED	61	66	101	68	49	60	48	47	55	17	73	115	148	109	137	106

PERSONNEL



USAFE PERSONNEL STRENGTH

(ASSIGNED AND TDY)

CATEGORY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MILITARY																
OFFICERS	2 256	2 395	3 232	4 101	4 452	4 521	4 383	4 566	4 565	4 626	4 753	4 815	4 814	4 594	4 012	3 273
AIRMEN	16 352	17 240	19 726	23 352	25 446	27 055	24 899	26 522	25 523	26 269	26 688	27 808	28 126	26 643	22 948	19 564
<i>SUB-TOTAL MILITARY</i>	<i>18 608</i>	<i>19 635</i>	<i>22 958</i>	<i>27 453</i>	<i>29 898</i>	<i>31 576</i>	<i>29 282</i>	<i>31 088</i>	<i>30 088</i>	<i>30 895</i>	<i>31 441</i>	<i>32 623</i>	<i>32 940</i>	<i>31 237</i>	<i>26 960</i>	<i>22 837</i>
CIVILIANS																
US-ALLIED	932	925	921	947	939	1 007	1 010	1 064	1 112	1 023	974	974	886	911	906	794
* GERMAN	22 144	22 692	23 447	23 276	23 488	23 617	23 367	24 062	24 088	24 598	24 732	24 091	22 152	22 545	24 833	20 931
<i>SUB-TOTAL CIVILIANS</i>	<i>23 076</i>	<i>23 617</i>	<i>24 368</i>	<i>24 223</i>	<i>24 427</i>	<i>24 624</i>	<i>24 377</i>	<i>25 126</i>	<i>25 200</i>	<i>25 621</i>	<i>25 706</i>	<i>25 065</i>	<i>23 038</i>	<i>23 456</i>	<i>25 739</i>	<i>21 725</i>
TOTAL USAFE	41 684	43 252	47 326	51 676	54 325	56 200	53 659	56 214	55 288	56 516	57 147	57 688	55 978	54 693	52 699	44 562

* DOES NOT INCLUDE GERMAN CIVILIANS AT FASSBERG AND CELLE FURNISHED BY THE BRITISH

MILITARY PERSONNEL



THE FIRST DAYS

Analysis in early 1948 revealed that the command was faced with the loss and replacement of 70 percent of its airmen between October 1948 and February 1949, and 82 percent of its officers between February and August 1949. To avoid these peaks a system of regulated rotation of personnel to the ZI in advance of their normally scheduled return was placed in operation in February 1948. The additional responsibilities of the Berlin Airlift forced the discontinuance of this advanced rotation effective 1 July 1948. While the discontinuance permitted the retention of personnel on hand at the start of the Airlift, it later created a serious problem of replacing experienced personnel during the winter months when operation was the most difficult.

Initially, the personnel at Rhein/Main and Wiesbaden Air Bases were augmented by attaching pilots from other USAFE stations on 14-day temporary duty. In the first weeks no long-range personnel planning was done as it was not contemplated that the operation would continue for more than 90 days.

By 6 July 36 C-54 type aircraft had arrived from Alaska, the Panama Canal Zone, and Hawaii and were attached to Rhein/Main Air Base. These aircraft and their



DAY AND NIGHT OPERATIONS REQUIRED TWO CREWS
PER C-47

crews were initially placed on 45-day temporary duty, which was later extended to 180 days. Personnel were permitted to request permanent change of station (PCS) to USAFE. Those who did not request PCS were returned to their former stations if more than six months remained of their overseas tour after completion of 180 days of Airlift flying duty, while those with less than that period remaining on their current overseas tour or enlistment were returned to the ZI.

An increase in the manning level to two crews per C-47 aircraft required the assignment or attachment to the Airlift of a total of 320 pilots later in July. This augmentation compelled new allocation from every station in USAFE, which resulted in the attachment of several fighter pilots who had never flown multi-engine aircraft.

Utilization of every available pilot in USAFE provided an emergency pilot pool to stop the gap until reinforcements could be obtained from other commands.

REQUIREMENTS

The troop carrier groups that "carried the ball" during the incipient period of the Airlift were organized under the "Peace" columns of the "Medium" Tables of Organization. Late in the summer all groups were reorganized under the "War" columns of the "Heavy" Tables to provide additional personnel. However, these wartime authorizations were unsuitable because they included a large number of unusable specialist SSN's such as armorers and ammunition handlers, and did not provide sufficient aircrew, air operations, and air transportation personnel. No guide was available to determine requirements in this specialized operation.

As an expedient, group commanders were directed to specify their requirements, but their personnel requests lacked uniformity even though their group missions were comparable. The situation was improved by the issuance of Tables of Distribution based on manpower studies. This was not the final solution, however, for it was months before worthwhile conclusions could be drawn from experience, and the periodic increase in tonnage targets precluded stabilizing personnel requirements.

Even at the cessation of the blockade of Berlin the respective headquarters of USAF and USAFE were in disagreement as to the personnel required for a sustained airlift operation.

In any operation of this nature, authorizations must be established as soon as possible to permit sound personnel planning.

TEMPORARY DUTY, TEMPORARY TENURE, AND SHORT TERM (6 MONTHS) PCS

The air transport and troop carrier squadrons were originally attached to USAFE for varying periods of 45-, 60-, and 90-day temporary duty. The majority of the casualties were on 90-day temporary duty. The temporary duty period of all individuals and organizations on TDY was extended to 180 days in September by Headquarters USAF.

To differentiate between the various categories of temporary duty personnel, those in organizations from other overseas commands were considered as being on "temporary tenure" while those in organizations from the ZI and all casualties were considered as being on temporary duty.



AND UTILIZATION OF EVERY AVAILABLE PILOT.

As the tonnage targets increased, it was necessary either to obtain additional personnel or to retain the personnel then attached. Personnel in a temporary status were encouraged to extend to 11 months or to convert to permanent assignment to USAFE.

The criteria and administrative procedures for converting to permanent assignment status provided by Headquarters USAF are worthy of mention. Airmen who volunteered to remain in USAFE on a PCS status were reported to their home stations for the issuance of new orders changing their status to PCS, after which they were assigned to units and duties in accordance with the requirements of USAFE. Those who desired this change, yet found it necessary to return to their former stations in the ZI to arrange for the settlement of personal affairs, were authorized a 30-day leave upon the completion of 180 days of duty on the Airlift. Casual officers who volunteered to remain in USAFE in a PCS status were reported to Headquarters USAF for issuance of proper assignment instructions to home stations and were authorized the same leave privileges. Any properly clearances required at ZI stations were arranged through appropriate boards of officers. Personnel from other overseas commands whose presence was required at home stations for settlement of personal affairs were not permitted to convert to PCS, but were returned to their home stations on a permanent basis upon the completion of 180 days' temporary duty.

During the build-up of the Airlift, aircrew personnel who graduated from the Great Falls Replacement Training Unit were assigned to USAFE on a six-month PCS status, commonly called "Short Term PCS." These personnel were also authorized to change to a normal overseas tour, and those who had already submitted applications for the movement of dependents to this command were considered as having applied for such a tour. By 1 July 1949, 596 of the 1,675 RTU pilot graduates and approximately 280 of the 700 airmen graduates requested a normal tour.

The peculiar status of some 150 pilots and enlisted aircrew members who had reported to this command on PCS prior to the activation of the Great Falls RTU was

clarified by Headquarters USAFE 1 April 1949. Personnel in that category, who desired, were authorized to return to the ZI after completion of a six-month Airlift tour. They were offered the same choice of six-month or normal tour as was permitted for RTU graduates. Again, personnel who had already submitted applications for the movement of dependents were considered to have requested retention for a normal overseas tour.

Only about one-third of the personnel originally on TDY or on "short term PCS" with the Airlift volunteered to convert to a normal tour. In the majority of cases of personnel on TDY the emergency of the situation prohibited advance notification of even as much as 10 days prior to overseas shipment. The lack of a sufficient alert period was influential in the decision of many personnel not to convert to a normal overseas tour, in spite of authority to obtain a leave after the first six months. It is generally agreed that a minimum of a 30-day alert should be given personnel prior to overseas shipment.

AIRCREW REPLACEMENTS

The program of the Great Falls RTU scheduled a monthly output of at least 208 pilots and 104 crew chiefs. The first of these personnel arrived in USAFE 4 November 1948, and within a month a steady stream of replacements was flowing into the Airlift.

The RTU graduates arrived in USAFE by air at the 7013th AF Replacement Squadron, Frankfurt, Germany. To facilitate their assignment to duty, that squadron reported them direct to Headquarters 1st ALTF without reference to Headquarters USAFE. This resulted in arrival of these personnel at their duty stations within 24 hours of their arrival in Germany.

Air Force Letter 35-143, 1 April 1949, announced the rotation policy governing aircrew members assigned to USAFE after graduation from the Great Falls RTU. Individuals who had reported to the RTU prior to 1 May 1949 were authorized to return to the ZI for reassignment upon the completion of six months of duty with the Airlift. Individuals who reported to the RTU on or subsequent



to 1 May 1949 were assigned to USAFE for a normal overseas tour.

As noted in the previous section, RTU graduates who so desired could request a change of status from six-month to normal PCS. All of the 180 crew chiefs who had requested a normal tour with USAFE were retained in that duty. Of the 596 pilot RTU graduates who had requested a normal overseas tour with USAFE, 412 were to be utilized as pilots during all of their tour. One hundred and eighty-four were to be utilized in MOS's other than pilot after the completion of six months of flying duty. This policy, based on these pilots' qualifications in critical and acutely short non-flying MOS's, received the concurrence of Headquarters USAF. Accordingly, it was possible to reduce the flow of pilot trainees by 412 and reduce the USAFE officer requisitions for other specialties by 184 as projected to 1 December 1949.

By December 1948 sufficient pilot personnel had been received to provide 2.63 crews for each operational aircraft. Experience indicated that this manning level was insufficient to meet constantly increasing tonnage requirements. The figure of 3.0 crews was determined as necessary. Concurrently with the consideration of this proposal, 15 December 1948 to 8 January 1949, USAFE received 39 C-54 aircraft needed to meet the ordered increase in tonnage. Nineteen of the crews which ferried these aircraft returned under orders to the United States. The remaining 20 crews, mostly from MATS stations, were retained in USAFE on an assigned basis.

The manning of these additional aircraft required that the available pilots be spread even more thinly to the point of reducing the over-all manning level to 2.29 crews per aircraft. Tonnage obligations then being met required an operating minimum of 2.5 crews per aircraft. The reduction of this level to 2.29 created an emergency situation, and Headquarters USAF was requested to make available 194 pilots direct from ZI stations. This direct assignment, by-passing the Great Falls RTU, was calculated to advance their arrival by as much as five weeks. Approximately 30 pilots arrived against this emergency requisition before a stepped-up graduation rate at the RTU made it possible for USAFE to cancel the remainder

of the requisition.

The increased flow from the RTU and the number of pilots converting from temporary duty to permanent change of station accomplished a build-up to the desired three crews per operational aircraft, with sufficient additional pilots to perform the related duties of check pilots and standardization board members. The overage in crew chiefs at this time was utilized on ground maintenance.

PERIODS OF TDY

Accurate estimates of the geopolitical situation had been made both at the Department of the Air Force and the Department of State levels. We have noted that personnel and equipment were generally placed on 90-day temporary duty. In September 1948, approximately 90 days after the commencement of the Airlift, the interested powers conferred on discontinuing the blockade of Berlin, but no agreement satisfactory to all governments was reached. The blockading power seemingly calculated that poor flying weather during the winter would render impossible the supplying of a city by air. In that same month the temporary duty period of all personnel was extended to six months. This action, in the majority of the cases, terminated the tours in January. By that time, it was believed, it would be possible to evaluate the success of operations during November and December, the worst months for flying weather.

The bold geopolitical estimates were vindicated, for in the month of May 1949, final agreement to cease the blockade was reached on high governmental levels.

REQUISITIONS ON PCS BASIS

Hundreds of personnel on temporary duty had been of indispensable assistance in building up the Airlift, but personnel on a permanently assigned basis were needed after the opening phase of such an emergency operation.

At the commencement of the Airlift, requisitions for officer personnel had already been submitted to include requirements to 1 December 1949. Requisitions for this

period were for fewer officers than the number of forecasted returnees, owing to the reduction in authorizations and the implementation of a system of regulated advanced rotation.

Because of the immediate additional requirements of the Airlift, an emergency requisition for 264 officers was submitted by teletype on 5 August 1948. The message included a request for 64 four-engine pilots and 10 aircraft maintenance officers on 90-day temporary duty to fill shortages in C-54 squadrons recently attached to USAFE. An emergency requisition was submitted on 9 September 1948 requesting 62 officers in critical MOS's. On the same day a consolidated requisition was submitted by letter to provide replacements for the 465 officers who would complete normal tours and 6-month temporary duty tours during December 1948 and January and February 1949.

The increase in tonnage targets and resulting increase in authorizations forced a change in the requisitioning schedule, which was altered to provide for the requisitioning of anticipated shortages as of 1 January 1949 and of replacements for the following months. Unfilled balances of all outstanding requisitions were cancelled, and this headquarters was notified by Headquarters USAF of the number of officers by MOS that had applied against each previous outstanding requisition.

Requisitions for the months of January to August 1949 were based on losses due to completion of a normal tour, a 6-month PCS tour (Great Falls RTU graduates), and periods of temporary duty varying from 6 to 11 months. However, the complexity of accurately computing the above losses for each month is readily apparent. There were daily changes due to the number of officers changing their status from temporary duty, temporary tenure, and 6-month PCS to normal PCS. There were also numerous early returns to the ZI because of hardship or for further training of rated officers whose primary aeronautical rating was bombardier. The reassignment of qualified navigators to that primary duty and the reassignment of Great Falls RTU graduates who were qualified in critical or acutely short MOS's to duties in those specialties, after the completion of six-month flying duty, con-

tributed to the complexity of accounting for losses. These factors, coupled with the differences between the authorizations from Headquarters USAF and the requirements as established by the DCS/Operations, Headquarters USAFE, resulted in some requisitions being nothing more than the broadest estimates of needs.

Headquarters USAFE also submitted requisitions for the 59th Air Depot, Burtonwood, England, until 5 January 1949, when that organization and the 3rd Air Division were assigned direct to Headquarters USAF. These requisitions requested that assignment of personnel be made direct to England and that information copies of related correspondence be furnished Headquarters USAFE.

The accompanying tables illustrate USAFE's personnel requirements and resources during the Airlift period, and the requisition actions taken to maintain the proper officer and airmen personnel levels.

The procedure in requisitioning airmen was complicated by the same factors which affected the procurement of officers. In general, airmen requisitions were submitted in blocks of 1,000. A relatively small number of enlisted men was requisitioned for the 438th Signal Aviation Construction Company and the 862d Engineer Aviation Battalion, the two Department of the Army units assigned to USAFE. As requirements increased, emergency requisitions were submitted requesting large numbers of airmen in the communication, maintenance, and supply fields.

Subsequent to 28 February 1949 requisitions for airmen were no longer submitted, as Headquarters USAF made assignments on the requirements reflected in the Report of Air Force Personnel, RCS AF-SC-P2, submitted by Statistical Services, Headquarters USAFE. Submission of special requisitions for SCARWAF enlisted personnel continued.

During some months as high as 70 percent of the airmen assigned to USAFE from other commands were basic airmen, SSN 521. Over 4,000 basic airmen were assigned to USAFE between October 1948 and February 1949. None of them had been requisitioned. Headquarters USAF was informed that the responsibility of providing on-the-job training for these airmen was seriously reducing the



operational efficiency of the Airlift. The flow of basic airmen was stopped, and some already in the command were returned to the ZI.

The most important shortage of airmen was in the maintenance field. Fifteen ground crew maintenance personnel per aircraft was the manning level considered essential for sustained operations. During January 1949 the manning level was 7, and during July it was 12. Many of the maintenance personnel who were assigned to USAFE as late as April 1949 were not considered fully qualified for duty in an operation of emergency tempo. Communications to Headquarters USAF reporting these shortages resulted eventually in the assignment of many highly qualified maintenance personnel. The following figures illustrate that 28 percent of the airmen authorized in the maintenance field arrived after agreements had been reached to lift the blockade:

Airmen Assignments in Maintenance Field

April 1949	153
May 1949	537
June 1949	869
July 1949	136

(Total for May and June is 1,406, or 28 percent of the 5,092 authorized.)

MANNING OF SPECIAL PROJECTS

An operation of the magnitude of the Airlift invariably requires the manning of special organizations and projects with personnel of particular qualifications.

Several liaison officers were required for attachment to Headquarters, British Air Forces of Occupation, and to Gatow and Tegel Airfields in Berlin. These personnel not only were qualified in air transport operations but also were screened for the attributes and personal characteristics essential to cordial relations with other nationalities.

Prior to the arrival from Japan of a United States troop carrier wing at Celle RAF Station, a contingent of personnel was dispatched to provide a housekeeping and receiving unit. This contingent consisted primarily of 24 officers and over 200 airmen on PCS and 16 officers on temporary duty. The spadework of this group was co-ordinated with an advance party of the incoming troop carrier wing consisting of the wing commanding officer, the group commanding officer, and the wing deputies for personnel and supply, who arrived in the command by air three weeks before the wing arrived by water transportation.

The unfavorable flying weather forced the activation of an in-flight weather reconnaissance squadron in November 1948. Twenty-four pilots, qualified in B-17 aircraft, were withdrawn from the Airlift and assigned to this organization.

As in the case of the C-54 personnel, the C-82 crews used at Wiesbaden Air Base were originally on 90-day temporary duty, extended to 180 days; but only one crew converted to permanent change of station. It was not difficult to find replacements, however, for many of the troop carrier personnel in the command were fully qualified in C-82 aircraft.

REQUISITIONS FOR KEY OFFICER PERSONNEL

A major personnel problem was the procurement of key officer personnel. Upon the request of the Commanding General, Headquarters 1st ALTf, Headquarters USAFE on 16 October 1948 requested several key officers by

USAFE OFFICERS

	1 9 4 8							1 9 4 9								
	30 June	31 July	31 Aug	30 Sept	31 Oct	30 Nov	31 Dec	31 Jan	28 Feb	31 Mar	30 April	31 May	30 June	31 July	31 Aug	30 Sept
REQUISITION BASIS																
Authorized	2539	1989	2172	2386	3284	4222	4189	4307	4348	4574	4270	4234	3751	3933	3990	3198
Required (Established by DCS /O, Hq USAFE)		2446	2516	2720	4057	4926	4958	4227	4687	4704	4376	4195	4167	3906	3851	2946
RESOURCES																
Assigned to USAFE	2256	2298	2427	2720	2851	3136	3402	3853	4190	4481	4675	4770	4787	4584	4009	3273
Assigned to Organizations TDY to USAFE	0	0	481	727	910	668	258	0	0	0	0	0	0	0	0	0
Individuals TDY to USAFE	0	97	324	654	691	717	723	713	375	145	78	45	*27	10	3	0
Total	2256	2395	3232	4101	4452	4521	4383	4566	4565	4626	4753	4815	4814	4594	4012	3273
REQUISITIONS (Not including 4-Engine Pilots)																
Number Requisitioned to arrive during month	125*	90*	80*	43*	117*	Normal 130 Emergency 264	Dec-Feb Consolidation 464 Emergency 62	Normal 240 1 Jan Shortages 163	165***	272***	243***	206***	113***	68	0	0
Number Approved By Hq USAF	#	#	#	#	116	Normal 129 Emergency 221**	Consolidation 171** Emergency 11**	Normal 178 1 Jan Shortages 126	83	199	110	87	61	53	—	—

Not Available

* During this period officer requisitions were far less than the number of returnees to the ZI due to the planned reduction in authorizations and the system of regulated advanced rotation. (The November requisition was submitted by letter on 16 June 1948).

** Items filled before cancellation on 2 December 1948. A new requisition procedure was established by Headquarters USAF (see text).

*** Requisitions based on the figures in "Required" line above. Because these requirement figures established by Headquarters USAF were in excess of the authorizations established by Headquarters USAF, a considerable number of the requests were disapproved.

USAFE AIRMEN

	1 9 4 8							1 9 4 9								
	30 June	31 July	31 Aug	30 Sept	31 Oct	30 Nov	31 Dec	31 Jan	28 Feb	31 Mar	30 April	31 May	30 June	31 July	31 Aug	30 Sep
REQUISITION BASIS																
Authorized	18402	12645	13856	15596	18605	24524	22898	22219	22366	22724	22716	22717	19678	21514	21514	17387
Required (Established by DCS/O, Hq USAFE)	—	17163	17275	18216	24011	28794	27719	26012	25354	25229	25013	24210	23587	21673	21235	16834
RESOURCES																
Assigned to USAFE	16352	16733	17268	19410	20555	20836	19613	21590	21988	24701	25853	27361	28006	26569	22925	19559
Assigned to Organizations TDY to USAFE .	0	0	1515	2068	2583	1570	557	0	0	0	0	0	0	0	0	0
Individuals TDY To USAFE	0	507	943	1874	2308	4649	4729	4932	3535	1568	835	447	120	74	23	5
Total	16352	17240	19726	23352	25446	27055	24899	26522	25523	26269	26688	27808	28126	26643	22948	19564
REQUISITION DATA																
Requisitioned (PCS & TDY) During month .	1639	1789	4744	4246	#	#	1364	1078	1132	0*	126*	197*	0*	0*	0*	0*
Arrived During Month	247	1217	1050	1369	#	#	1006 (Included 70% "Basics")	2554 (Included 30% "Basics")	926 (Included 30% "Basics")	3133 (Included 30% "Basics")	1630	2133	1162	274	122	68

Not available

* Figures include ARWAF and SCARWAF only. Effective 1 March 1949 no requisitions were submitted on USAF personnel. Shipments were based on the Report of AF Personnel, AF-SC-P2.

name, listing the candidates in the order of preference. The majority of these personnel were known to have performed duty with air transport units during or after World War II.

Subsequent correspondence revealed that some of these personnel were unavailable as they were not on active duty, could not be released from their present assignments, were not vulnerable for overseas assignment and were unwilling to volunteer, or had by retraining lost the specialized ability for which they were sought.

Late in February 1949 information was received giving the names of the key personnel to be shipped to this command. Their established time of arrival was late April. This list included a few of the personnel who were previously requested by name. Negative replies to subsequent name requests contained a reference to AFR 36-3, "Requisitioning of Officer Personnel," which prohibits requisitioning by name except for a limited number of duties.

Emergency requisitions for key personnel by MOS and any other necessary special qualifications were being filled in two or three months. Requesting key personnel by name more than doubled the normal time between the date of request and the date of arrival.

CLASSIFICATION AND AUDIT

Personnel classification and audit, the activity of identifying people by the skills they possess and monitoring their assignments, is essential to the success of any organization. When that organization is engaged in war or an emergency operation, the proper utilization of all available human skill becomes vital to success.

Uncertainty as to the duration of the Airlift and the initial emphasis on operational rather than administrative problems retarded the establishment of a vigorous personnel classification and audit system. After two months of operation, shortages in certain skills became serious. On the theory that this could be partly alleviated by proper utilization of available personnel, a comprehensive study of personnel utilization was initiated in September 1948.

This study indicated that 20 percent of all airmen were assigned to duties other than those for which classified. Approximately two-thirds of these airmen were training out of specialties in which other airmen were undergoing on-the-job training.

A study of personnel administrative procedures at the wing, group, and squadron levels failed to reveal any uniform method of distributing skills on the basis of position vacancies. Information concerning the occupational requirements of each unit and an inventory of the skills available were needed at all echelons of command. To meet this requirement, the USAFE Manning Chart was established. This chart was similar in form to the old AF Form 127, indicating the personnel authorized and assigned each unit within specification serial number.

Meanwhile, USAFE Air Inspector reports indicated that the maintenance of Airlift personnel records and personnel accounting was deteriorating. Inspection revealed the causes to be a lack of qualified personnel specialists and inadequate distribution of directives. A means had to be provided to assure proper maintenance of personnel records, and the attention of the USAFE Personnel Audit

Team was shifted to the Airlift during December 1948.

Initial personnel audits of Airlift organizations were conducted in conjunction with inspections by the Statistical Services Directorate of the USAFE Comptroller. These audits disclosed discrepancies in personnel accounting, maintenance of personnel records, and personnel utilization. The recommendations made led to correction of many of the deficiencies.

The magnitude of the audits required the formation of an additional personnel audit team operating under the jurisdiction of Headquarters 1st ALTF. During the five months of its existence this new personnel audit team conducted two comprehensive audits of each Airlift unit. Specific recommendations were made for reclassification and reassignment of individuals, procurement and application of personnel directives, and readjustment of personnel administrative procedures at wing, group, and squadron level. The effectiveness of the personnel audit team was demonstrated by vast improvements in personnel administration and a steady decrease in the number of personnel mal-assignments.



AIRLIFT PERSONNEL WERE REWARDED FOR A JOB DONE

AWARDS AND DECORATIONS

Credit for a job well-done has always been one of the greatest rewards of military service. The personnel who participated in the Airlift received this recognition through the presentation of awards and decorations.

Authority to award the Air Medal in connection with the Airlift was delegated by the Department of the Air Force to the Commanding General, USAFE. The presentation of this award recognized the round-the-clock services of aircrews who flew the narrow aerial corridor to Berlin with three to seven-minute intervals between aircraft and who frequently executed take-offs and landings in dense fog that was penetrated only by the guiding instructions of the GCA operators.

The primary basis for this award was the completion of 100 missions to Berlin. The date 1 September 1949 was designated as the final date for the compilation of the number of missions completed. Any airman or officer who lost his life while participating in aerial flight on the Lift received posthumous consideration for the award. Meri-

torious achievement while participating in any mission where unusual circumstances prevailed constituted another basis.

The Berlin Airlift device is a special Airlift decoration. Its official description is "a gold-colored metal miniature of a C-54 type aircraft of a 3/8-inch wing span, other dimensions proportionate, which is worn on the service ribbon or on the suspension ribbon of the Occupation Medal for Germany with the nose pointing upward at a 30-degree angle and toward the wearer's own right." This device was awarded to personnel who had performed "service for 90 consecutive days while assigned or attached to a unit in the Occupation (Forces) of Germany which has been designated in General Orders of the Department of the Army or Department of the Air Force as participating in the Berlin Airlift between 26 June 1948 and a terminal date to be announced later."

The Congress of the United States has authorized "The Medal for Humane Action" to recognize those individuals who distinguished themselves by meritorious participation in the humane military effort to supply the

necessities of life to the people of Berlin. The exact requirements for this award and the design of the medal have not been published. The colors for the ribbon of The Medal for Humane Action have been selected to represent the colors of the Coat of Arms of Berlin - red, white, and black - against a background of blue symbolizing the sky from which the beleaguered city was supplied.

From July 1948 to October 1949, 2,709 awards were made to Airlift participants. This number included 2,374 Air Medals, 1 Distinguished Flying Cross, 2 Distinguished Service Medals, 68 Legion of Merit Awards, 11 Soldier's Medals, 1 Cheney Award, 245 Commendation Ribbons, and 7 awards to civilians for meritorious service.

Participating United States Naval personnel were eligible for and received awards on the same basis as United States Air Force personnel.

THE PHASE-OUT

Planning for the necessary reduction in force necessitated by the cessation of the blockade of Berlin began in 1948. In the middle of May 1949 the personnel plan became operational; all organizations were directed to screen personnel to determine their individual desires for retention or non-retention in the post-Airlift program and to ascertain the corresponding recommendations of their commanding officers. Personnel were listed in four categories or groups as follows:

- GROUP I - Desires retention and retention is recommended by commanding officer.
- GROUP II - Does not desire retention and release is recommended by commanding officer.
- GROUP III - Desires retention but is not recommended for retention by commanding officer.
- GROUP IV - Does not desire retention but retention is recommended by commanding officer.

The directive emphasized that the report was for planning purposes only and did not constitute a promise of retention in USAFE or of return to the ZI after the cessation of the blockade.



Plans were made for retention of a small number of overages in many specialties, since only tentative authorizations for post-Airlift USAFE were available. It was not until 29 October 1949 that Headquarters USAFE forwarded to Headquarters USAF the breakdown of the USAFE bulk allotment for personnel. In spite of the drastic reductions in requirements, shortages in certain acutely short and critical MOS's still existed. In general, these shortages were the same as the USAF-wide "Critical USAF MOS's" enumerated in AFR 35-34, 16 March 1949.

Personnel were earmarked as "retainable" or "non-retainable" on the basis of their desires and the recommendations of their commanding officers. At the direction of the Commanding General, USAFE, personnel with dependents in the command or enroute were given preference for retention. This policy was modified in late August because the large number of retainable personnel with dependents presaged a continued housing shortage. To avoid the creation of abnormal replacement conditions due to the rotation of personnel three years after the build-up of the Airlift, priority for retention was also given personnel who arrived prior to August 1948 and subsequent to May 1949.

In July, lists of retainable and non-retainable personnel were forwarded to all bases for verification. In August, commanders were authorized to make substitutions within grade and MOS, for it was an acknowledged fact that many changes had occurred in the three months that had elapsed since the original survey was completed. Subsequent to 11 October, only personnel who were listed as non-retainable and had dependents in the command remained in the non-retainable category. Following that date all other overages in USAFE were considered as retainable and were reassigned elsewhere in USAFE as required or returned to the ZI.

Separate communications from Headquarters USAF authorized Headquarters USAFE to reassign surplus personnel required by other overseas commands, including the Atlantic Division of MATS, the 1602d Air Transport Wing, the 3rd Air Division, the 1807th AACs Wing, and the 2105th Weather Group. As of 1 November 1949, 71 officers and 250 airmen were reassigned to those commands.

As stated above, this command was still short some specialists. Headquarters USAF was informed that 36 officers of the many requisitioned and, presumably, then in the incoming pipeline, were still required in the post-Airlift program.

A significant administrative function of the phase-out was the reporting of personnel to Headquarters USAF prior to their return to the ZI. Airmen with dependents in the command were individually reported by teletype and were not released until their assignment instructions were received. All other departing airmen were reported in daily teletype messages by totals in specification serial numbers.

Headquarters USAFE reported officers daily by teletype, utilizing a status file which contained a card on each officer indicating all information needed for his reassignment plus the date and method of his travel. This file not only expedited preparation of the reports, but also served as a convenient reference file. To facilitate reassignments in the ZI, information copies of all messages were furnished the Air Force Overseas Replacement Depot and the Port of Aerial Debarkation. Officers who had been recommended for relief from active duty under the provisions of AFL 36-3, 5 August 1949, were reported in classified messages.

Mainly for reasons of economy, the phase-out was expedited, and by 1 November the outshipment of personnel was well in advance of planned reductions. As of that date 1,768 officers had departed against a required 1,100, and 8,630 airmen had departed against a required 4,576. This expedited reduction was made possible by the utilization of spaces aboard Airlift C-54 aircraft being returned to the ZI and additional spaces made available by Headquarters EUCOM aboard scheduled MATS aircraft and surface transports.

CONCLUSIONS

Experience in the Berlin Airlift indicates that, as a general rule, peak efficiency cannot be expected of personnel on a protracted period of TDY. The low morale

of personnel absent from their families and obligations for periods of several months severely reduces the quality of their job performance. Further, a large percentage of the unmarried personnel have a "temporary" attitude which tends to restrict their job effort. Periods of necessary TDY should not exceed 45 days, after which TDY personnel should be replaced by others on a PCS status. The importance of this is considered sufficient to warrant deviation from any existing policy governing frequency of overseas tours of duty.

Attempts to fill key officer positions by name request for certain individuals often proved unsuccessful in this operation, as it has in the past. If requisitions for officers for key positions had been limited to clear and complete descriptions of the position requirements, the delay in filling these positions caused by rejected name requests would have been prevented.

The Berlin Airlift was formed from units, parts of units, and individuals from areas throughout the world. Because of difficulties arising from its heterogeneous character, accurate personnel accounting was not obtained until seven months after the operation started. Command-wide verification of the effective use of these personnel was delayed until proper accounting could be established. After several months' experience indicated inability to secure accurate accounting by usual methods, a special team of accounting and classification personnel was organized for first-hand analysis and correction of the deficiencies of personnel and classification sections at unit level.

The work of the team would have been simplified and its objective reached earlier had it been placed in operation in the first months of Airlift, before the passage of time made it increasingly difficult to unravel confused accounting and classification records. Accordingly, it is believed correct to anticipate that a confused personnel accounting and utilization situation will exist in the initial phases of any future large-scale emergency air operation and that a similar team, which can make on-the-spot analyses and correction of errors, should be put at work during the opening days of the operation.



AERIAL VIEW OF THE 476-UNIT DEPENDENT HOUSING PROJECT IN MUNICH.

HOUSING POLICIES

Military personnel and their dependents in Germany are housed only in public buildings and private residences requisitioned from the German economy. With the gradual reduction of military personnel in USAFE prior to the Airlift, excess dependent housing was periodically de-requisitioned and only sufficient homes were kept to meet actual military requirements. Thousands of private German residences had been destroyed during the war. Throughout Germany there was a critical housing shortage, and it was theater policy to return buildings to the Germans when the military need for their utilization had passed. There was also a theater policy which prohibited the renting of private residences or hotel accommodations by any member of the Armed Forces, and a policy that no additional residences be requisitioned.

It was thought that the Airlift operation would be of short duration and personnel were brought to Germany

on a temporary duty basis. It soon became evident, however, that the Airlift operation would continue for an indefinite period, and authority was given for temporary duty personnel to change to PCS. Personnel had been hurriedly transferred on temporary duty to USAFE, and in many instances transport air crews were ordered on 60- to 90-day temporary duty to USAFE on only a few hours' notice. Many personnel ordered to USAFE from the Far East had been in that area without their dependents for more than a year. In some cases their dependents were on the high seas enroute to join them in Japan when the sponsors were suddenly sent to Germany by air.

MINIMIZING THE SHORTAGE

In order to maintain the Airlift on a more permanent operational basis, it was felt necessary for morale purposes either to: (a) build the units up to strength with personnel on a PCS status, or (b) place personnel on duty with the Airlift on a temporary duty status for six months, leaving

their dependents at their permanent stations. Both systems were actually utilized.

Housing surveys were instituted at all Airlift stations, and small amounts of housing space were procured. A majority of this housing, however, was located at a considerable distance from the Airlift bases.

Adequate housing on a permanent basis for the increased numbers of Airlift personnel at or near their places of duty was an immediate impossibility. There was such a great morale factor involved, however, that every attempt was made to permit Airlift personnel on permanent change of station to bring their families to Europe. From a morale point of view dependent housing soon became the biggest personnel problem.

An increasing number of Airlift personnel requested PCS orders; and the seriousness of the increasing housing shortage is illustrated by the fact that between 12 November 1948 and 5 May 1949, 3,335 sponsors submitted applications for movement of their dependents to Germany. During the same period only 915 families were

returned to the ZI. In June 1948 USAFE had dependent housing in the locations and quantities indicated below (asteriks indicate Airlift bases):

Location	Family Units
Wiesbaden Air Base*	5
Wiesbaden Military Post*	1,109
Rhein/Main Air Base (Frankfurt)*	555
Erding Air Base	324
Neubiberg Air Base	225
Furstenfeldbruck Air Base	186
Oberpfaffenhofen Air Base	301
Landsberg Air Base	110
Kaufbeuren Air Base	361
TOTAL	3,176

Various arrangements were made to reduce the housing shortage. The British were able to provide very

limited numbers of housing units at Celle and Fassberg, and plans were made for construction of several hundred sets of new dependent quarters at those bases. In the American zone the Dependent Housing Center at Bad Mergentheim, capacity 350 families, and vacant dependent housing in the Munich and other areas were made available for the temporary housing of dependents. In addition, plans were drawn for construction of several hundred sets of permanent dependent quarters for Rhein/Main and Wiesbaden Air Base.

HOUSING AND MORALE

Each sponsor who desired to bring his family to the theater was informed of the critical housing shortage and advised that if his family was brought to Europe, they would possibly have to reside for an indefinite period at a temporary dependent housing center many miles from his duty station. It was pointed out to the individual that he would not receive rental allowance while his family occupied either permanent or temporary quarters in Germany; that he would assume a greater financial burden through being away from his family; and that family cooking and messing facilities were not available in the hotel-type dependent centers. Each sponsor, in making application for movement of his dependents, certified his understanding of the above facts.

The original problems caused by the sudden dislocation of personnel from their families by temporary duty orders to Germany were lessened when these personnel were permitted to rejoin their families temporarily to settle personal problems and to make application for the movement of their families to Germany. The very knowledge that their families could join them at some future date improved morale.

A new and more immediate morale problem arose, however, among the hundreds of dependent families living in temporary or permanent quarters in Germany, far removed from their sponsors' base. The added cost of subsistence in hotel-type messes and family problems further aggravated the hardship.

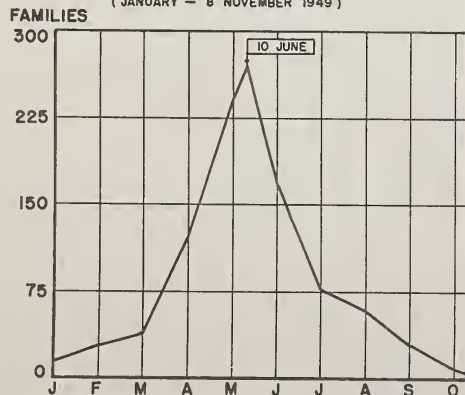
CONCLUSIONS

Experience during the Airlift operation demonstrated conclusively that individuals will tend to be overly optimistic when forewarned of housing and financial problems, and will apply for movement of their dependents overseas regardless of the possible difficulties. While temporary relief of the morale problem was attained by authorizing the movement of families to Germany, the resultant financial problems and the enforced separation of families within the command had a detrimental morale effect.

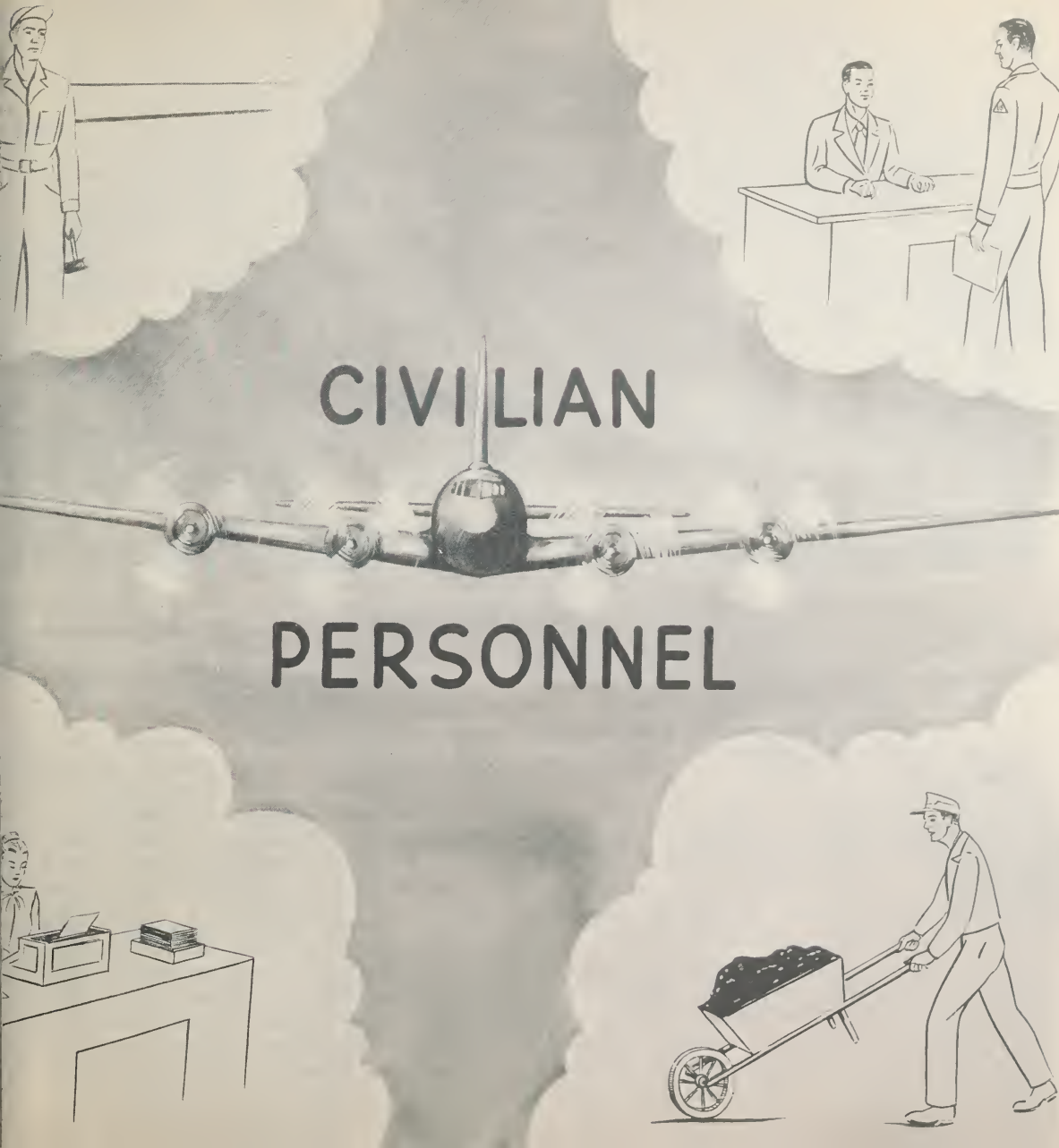
A long-range program for the construction of housing at Airlift bases was well underway with the sudden cessation of the Airlift, but the new construction could not have been completed for approximately a year.

AIR FORCE FAMILIES AT BAD MERGENTHEIM

(JANUARY - 8 NOVEMBER 1949)



INITIAL PHASE OF THE WIESBADEN HOUSING PROJECT.



The mission of the Civilian Personnel Office was not materially changed by the Lift; however, the work volume was substantially increased. This increase required the establishment of some new positions, plus many identical with those currently existing. Since the procurement, training, and administration of U.S. civilians posed no significant problems, the subsequent paragraphs will cover primarily the many problems encountered in the employment of German nationals.

The British Forces were responsible for the employment and administration of civilian personnel in their zone.

UTILIZATION OF U. S. CIVILIANS

Large numbers of U.S. and Allied civilians were actively engaged in all fields of Airlift endeavor and contributed substantially to the success of the mission.

U.S. civilians, on temporary duty status from the U.S., were included with the cadre which initially established Airlift Task Force Headquarters. While their contribution was significant and effective, their temporary duty status presented the following problems:

- (1) Temporary duty status was limited to 90 days, and extension of TDY was often delayed.
- (2) Civilians on TDY initially received \$7.00 per diem, much in excess of the 25 percent pay differential given to assigned civilian personnel for foreign duty; however, later the per diem rate was reduced to \$3.00, a partial solution.

It is strongly recommended that on similar foreign duty operations, U.S. civilians be employed on a permanent basis.

U.S. civilians employed by Headquarters 3rd Air Division were originally administered by the Wiesbaden Military Post. Administering to personnel at such a great distance was ineffective. On 26 June 1949 the responsibility for this civilian personnel administration was delegated to Headquarters 3rd Air Division, which by then was sufficiently staffed to accomplish it.

GERMAN NATIONAL AUTHORIZATIONS

Due to the shortage of trained airmen with aircraft maintenance specialties, it was decided in September 1948 to augment present Air Force authorizations with German national authorizations. This, it was hoped, would temporarily relieve a condition that was fast becoming critical. For security reasons, it was initially planned that German nationals perform only such menial duties as placing workstands, removing cowlings and rockerbox covers, changing spark plugs, washing down engines, checking tires, and cleaning aircraft. Later, German mechanics were employed in all ground maintenance activities which gave no control of the complete operation, and in which they were supervised by Allied personnel and allowed only a partial knowledge of a maintenance operation.



GERMAN MECHANICS PERFORMED MAINTENANCE UNDER ALLIED SUPERVISION.



RECRUITING AND TRAINING

The employment recruiting incentives for qualified German national aircraft workers were one free meal per day, inexpensive clothing, and free billets.

Each Airlift base was given a quota of 50 mechanics per operational squadron, later increased to 65 per squadron.

Recruiting was assisted by the use of radio and articles in leading German daily papers. In addition, the German Labor Offices' files were screened for potential aircraft maintenance, machine tool designers, and workers in related skills. German workers eager to do their part responded to the call for their assistance.

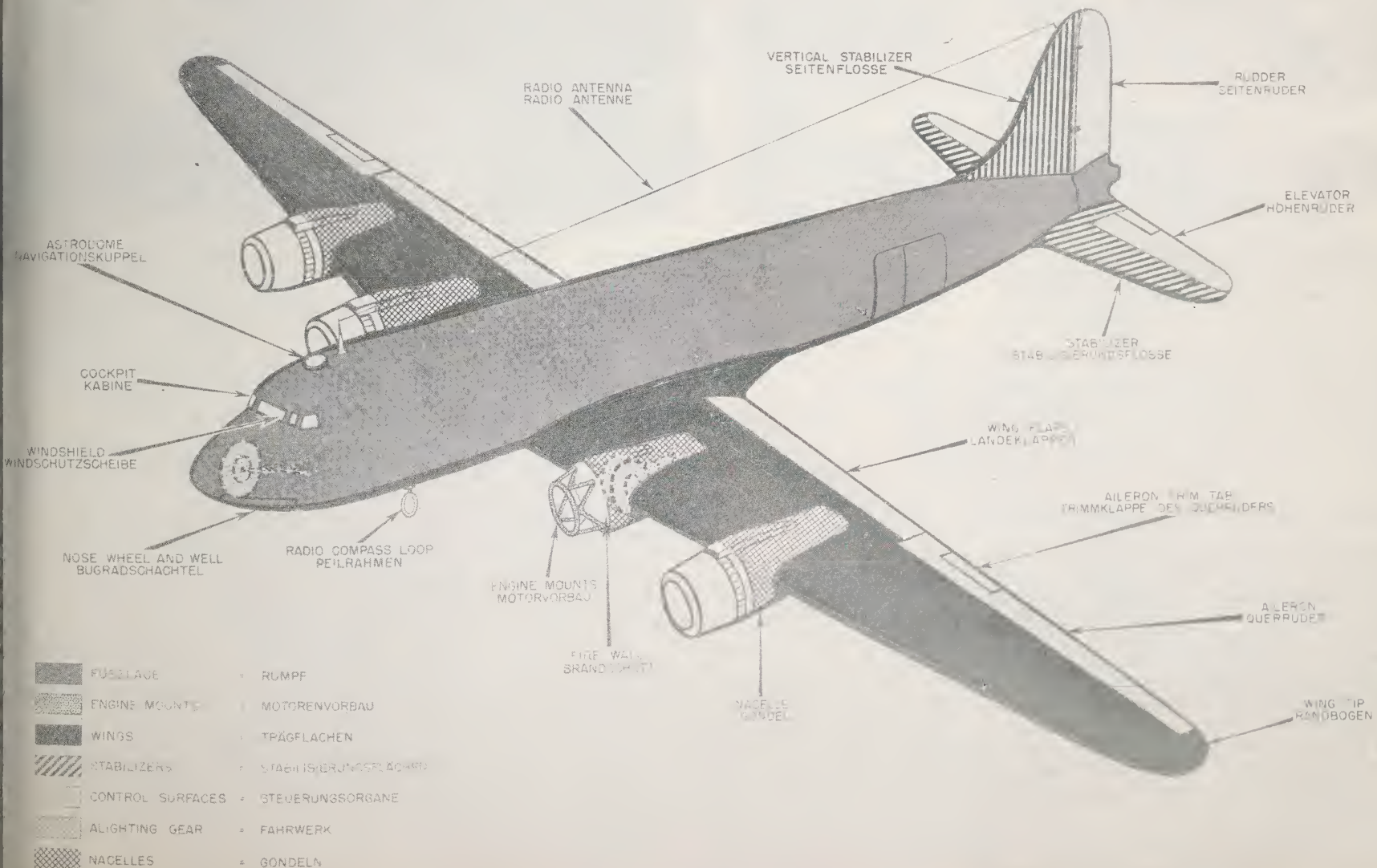
The assignment of qualified mechanics introduced another question. Authorizations received had not specified the number of individuals to be employed at the various levels - i. e., Masters, Seniors, Journeymen, Juniors, and Helpers. Since this was an important point from the

standpoint of management and economy, base-wide breakdowns based upon anticipated scheduling and utilization were agreed upon and uniformly applied throughout all squadrons.

Some squadron maintenance officers were anxious to employ electricians, locksmiths, carpenters, and similar personnel within their authorization of 50 persons. Headquarters 1st ALTF initially required that all personnel must be employed as aircraft mechanics, but at a later date, in response to wide demands, each squadron was given an additional authorization for two persons to permit employment of a general clerk and an interpreter.

While the mechanical skill of the German employees was for the most part satisfactory, the language barrier and the Germans' unfamiliarity with the American aircraft and equipment definitely retarded their initial effectiveness. The training problems were difficult, and the task of developing an English course which would include technical aircraft terminology as well as general mechanical

AIRCRAFT NOMENCLATURE TRAINING AID





terminology was an arduous one.

While civilian training sections were developing this type of English course, those concerned with the mechanical side of the operation were considering the technical training of mechanics.

For use as training aids, charts similar to the accompanying one were developed from technical orders on all pertinent aircraft terminology. They were used both for mechanical and language training. The mechanical and English training given German employees proved very effective.

EUROPEAN CIVILIANS OTHER THAN MECHANICS

Although the employment of German mechanics presented the most difficult problem from the civilian personnel standpoint, a major requirement existed for German personnel in almost every other function in support of the Airlift. Professionals, clerical personnel, and unskilled laborers were assigned a wide variety of tasks in connection with these supporting functions.

For the logistical support of the Airlift provided by the U.S. Army in Europe, it was largely necessary to utilize displaced persons and Germans. This group was primarily used to transport supplies from the railroad to the Aircraft. Owing to the speed with which the Airlift

was activated, little time was left for the normal recruitment of these laborers; however, a reserve was available in Labor Service Companies already organized and functioning in EUCOM depots and military posts. Scheduling of personnel in these companies did not present a problem, but it is well to note that maximum effectiveness was obtained from a 12-hour-on and 24-hour-off duty tour, with each man given one additional day off per week.

PHASE-OUT OF AIRLIFT OPERATIONS

Phasing out was a major civilian personnel problem. Many of the German civilian employees who had been of invaluable assistance throughout the Airlift were no longer required. Finding employment in Germany was difficult for skilled and the majority of unskilled persons; for many, the cessation of the Airlift meant unemployment for an indefinite period.

Recognizing this problem, Headquarters USAFE published a directive outlining the procedures for the large-scale reduction in force. The normal procedures used in the United States were considered impracticable. Rather, in selecting personnel to be retained, primary consideration was given to personnel who combined the longest service with the highest work performance; and

the outstanding service of many employees separated was officially recognized through the issuance of appropriate Certificates for Meritorious Civilian Service.

Many of the aircraft mechanics were absorbed by the command in normal mechanical and maintenance functions. For permanent reference, however, all installations prepared rosters of the post-Vittles addresses of all German mechanics who had satisfactory employment records. Should the need for mass utilization of German mechanical skills again arise, this recruitment reference will be invaluable.

CONCLUSIONS

Civilian employees assigned to duty with an overseas operation should be employed on a permanent basis if their period of duty is over thirty days.

Plans for a project, program, or operation which will probably require the use of non-military personnel should include provisions for training of civilian personnel in their own language and for education in the English language, where appropriate.

To maintain a high morale standard among civilian employees, their needs should be provided for impartially, without discrimination or special privileges for any class of personnel.

PERSONNEL SERVICES

YOUR SPECIAL SERVICES
Program

GAMES

PHOTO LAB

ARTS AND CRAFTS

MUSIC APPRECIATION

READING ROOM

DANCING

TOURS



The problems encountered in providing a recreational program for Airlift personnel were many and varied. The measures taken to provide that program are set forth in subsequent paragraphs.

SERVICE CLUBS

The first Special Services goal was that of establishment of the service clubs at newly activated bases and expansion of the club facilities at existing bases. Acquiring buildings was made difficult by the necessary priority placed on structures for operations, traffic, supply, messing, and the housing of personnel. Although in some instances the physical facilities available left much to be desired, space was provided for service club activities at every base.

Six additional service clubs were established at Airlift bases. The entertainment provided at these clubs was an effectively important part of the program for maintaining high morale among airmen.

Assisted by a hand-picked group of four hostesses from established bases, the staff hostess of Headquarters USAFE planned and organized clubs for Airlift bases. Under her supervision, clubs were organized almost overnight. Hostesses chosen for these clubs, usually four to each club, were those with several years of club work or associated experience. Because of the careful selection of the hostesses, the clubs maintained programs of the highest standard throughout the operation.

For the initial purchase of club furnishings, a grant of approximately \$78,000 was obtained from the EUCOM

Central Welfare Council. These furnishings were allocated to Airlift installations to start and expand service club operations. When the base central welfare funds became able to absorb the expense, local funds were available to pay for dance bands, floor shows, and refreshments and to purchase additional service club furnishings and recreational supplies.

LIBRARIES

Reading material was much in demand. Personnel who remembered the excellent distribution of pocket books, newspapers, and periodicals during the war asked for the same service; but distribution of this material had ceased. Only a few periodical subscriptions had been purchased from EUCOM Central Welfare Funds. To alleviate this situation, bases were given small grants to purchase copies of Stars and Stripes, the New York Herald Tribune (Paris Edition), and the Air Force Times until such time as the base welfare funds were able to assume this expense.

Bases made contracts or agreements with the publishers of Stars and Stripes to purchase copies of popular current magazines for distribution to newstands along the flight line and in pilot lounges and day rooms. Additional periodicals were collected at dependent billets and funds were allocated to purchase pocket books stocked by Stars and Stripes.

To obtain still additional books, an SOS was sent throughout the European Command for the scattered pocket books published by The Publishers' Council during the war. The response to this request was gratifying. In the two years since these books had been issued, the assortment of titles had been well "picked over." This necessitated careful sorting of these books for distribution. When a pilot or airman walked into a lounge and found 80 copies of "The Life of Enrico Caruso" his appetite for reading became somewhat jaded.

In order to keep periodicals and books in circulation, repositories were placed at various locations to receive the material people had finished reading. These repositories were emptied regularly, and the material was re-

distributed by librarians and hostesses. This was a circulating library in the literal sense.

In the meantime, existing library bookstocks were increased; and as each installation was established, its library was organized. Librarians selected collections in groups of 500 books, and adequate library bookstocks were soon established.

MOTION PICTURE SERVICE

The Army and Air Force Motion Picture Service was appropriately expanded to meet the new requirements. Theater schedules were adjusted to the 24-hour operation, and film presentations were scheduled so as to accommodate personnel of at least two of the three eight-hour shifts.

The principal problem was the lack of adequate theater facilities. Sixteen-millimeter film service was installed temporarily until adequate and suitable theater facilities could be provided. To overcome the lack of trained projectionists, German civilians who could meet certain requirements were employed and sent to the Army Signal School at Friedberg, Germany, where trainees were given an intensive five-day projectionist course. Upon satisfactory completion of the course, the German employees were licensed and placed on duty at Lift installations.

A SECTION OF THE "PROP AND ANCHOR" SERVICE CLUB, NEAR REIN/MAIN.



USAFE'S SPECIAL SERVICES LIBRARIANS DISCUSS THE LATEST BOOK NEWS.



ATHLETICS

Provision of an Airlift athletic program did not present a difficult problem at the established bases. At newly activated bases, however, the program had to be started with little or no facilities, supplies, or supervisory personnel. Improvisation was a dominant factor in the early development of athletics on the Airlift bases.

At one station, the Special Services Officer, with the assistance of sports-minded airmen, transformed an old bombed-out hangar into a temporary gymnasium serving approximately 6,000 participants monthly. A basketball floor, a boxing room, a volleyball court, a badminton court, a weight-lifting room, and a steam-bath room were provided. With the help of Air Installations, softball and touch-football fields were built. Dilapidated tennis courts were renovated, and horseshoe pits and outdoor volleyball courts were constructed for each squadron. An old cow pasture became one of the finest baseball diamonds in the European Command.

The inter-squadron, mass-participation athletic programs at each base were generally excellent. Leagues were organized for softball in the summer, touch-football in the fall, and basketball in the winter. Both player and spectator interest in these inter-squadron leagues was exceptionally high and contributed to improved morale of participating officers and airmen.

SPECIAL SERVICES SUPPLY

USAFE Special Services surveyed the first temporary base, Fassberg, and formulated its requirements for a well-integrated athletic program. But responsibility for Fassberg's logistical support was carried by the Bremerhaven Port of Embarkation, more distant from the depot at Aschaffenburg than was Fassberg. This arrangement required shipment of supplies from Aschaffenburg through Celle (past Fassberg) to the Bremerhaven Port of Embarkation, then back to Fassberg (and to Celle, when it was activated). Improved arrangements were later made to clear the supply papers with the port of embarkation,

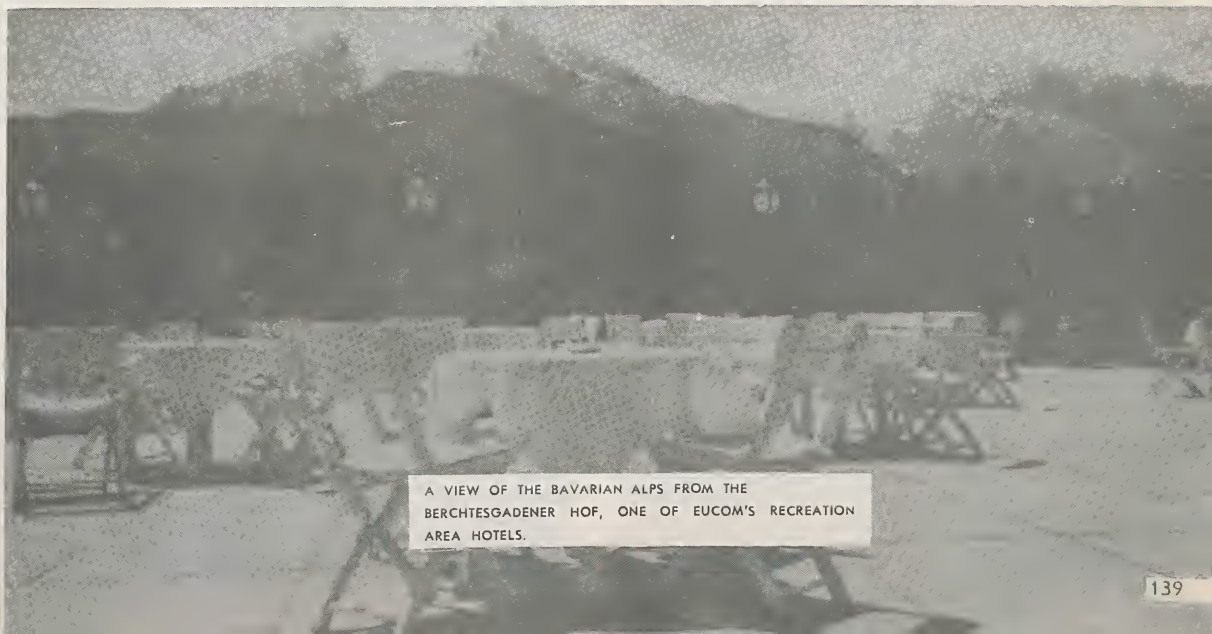
with direct shipment of supplies from Aschaffenburg to these bases.

Having profited by the experience gained in opening Fassberg, preliminary to the opening of Celle RAF Station, USAFE Special Services requested that the military post responsible for logistical support make available for immediate issue the necessary special services equipment. This procedure resulted in establishment of recreational programs at Celle with much less delay than at Fassberg. Locally manufactured furnishings were procured readily from Germany, Denmark, and England as the nucleus for development of special services activities of that station.

As the Airlift passed through the third and fourth month, opinion changed about the temporary nature of this operation and steps were taken to procure additional equipment. EUCOM Special Services diverted to Lift activities, equipment that had been intended for installations not involved in the operation. Within approximately four months, all bases were receiving priority furniture and equipment for service clubs, libraries, and crew lounges.

TOURS AND RECREATION CENTERS

To help provide each individual with the opportunity to visit many beautiful and historic points throughout Europe, inexpensive tours were operated by various governmental and private travel agencies. The European Command operated recreation areas in the German Alps at Garmisch and Berchtesgaden, both famous winter sports centers. The finest hotels there were requisitioned as accommodations. Charges at these hotels were computed on a cost basis, thus bringing these luxurious vacation spots within the means of the lowest-paid individual. Provisions were made for granting pass privileges whereby, at the discretion of the commanding officer, deserving airmen could be sent to the recreation areas of their choice at no transportation expense or loss of leave credit. Special quotas allotted for Airlift personnel assured suitable billets for everyone.



A VIEW OF THE BAVARIAN ALPS FROM THE BERCHTESGADENER HOF, ONE OF EUCOM'S RECREATION AREA HOTELS.

Vittles ENTERTAINMENT



CELEBRITY SHOWS

To supplement the entertainment program conducted throughout the Zone, big-name stage, screen, and radio performers were contacted. Through arrangements with the Special Services Division, Headquarters USAF, entertainment productions were packaged in the ZI and sent to Europe via MATS or special mission aircraft. The troupes were met upon arrival in Europe by an escort party of special service personnel responsible for billeting, messing, scheduling, and touring with the troupe. Considerable advance planning concerning stage adaptation and production was necessary, but the only problem of any magnitude was the large volume of stage properties required by the dramatic shows.

Experience indicated that the variety type show provided maximum entertainment for the minimum amount of equipment, expense, and personnel.

The accompanying illustration names some of the shows that toured the Zone under the Air Force program. One of these, the "Christmas Caravan" starred Bob Hope,

Irving Berlin, Jinx Falkenberg and Tex McCreary, and 29 other celebrities. Vice-President Alben W. Barkley and Secretary of the Air Force W. Stuart Symington accompanied the show, which arrived in Europe 21 December 1948 and during the following 10 days gave presentations at Wiesbaden, Berlin, Fassberg, Celle, Rhein/Main, and Burtonwood, England.



THE "CHRISTMAS CARAVAN" PRESENTATION IN BERLIN.

SOLDIER SHOWS

To encourage and assist in the production of soldier shows, entertainment specialists with theatrical background or "Little Theater" experience were employed in the ZI and sent to this command. "Little Theater Guilds" were established at individual stations. Dependents of Airlift personnel also assisted with and at times performed in these shows, which provided an excellent source of entertainment. The best locally produced soldier shows toured other military installations throughout the U.S. Zone.

Typical of these soldier shows was "Vittles Varieties", which was produced by the Special Services Section, Headquarters 1st ALTF. Talent was drawn from all Airlift stations, and the enthusiasm and conscientious effort of all who participated made the show a gratifying success. "Vittles Varieties" was presented at all Airlift bases and, in response to many requests, at other installations in the European Command.



SCENE FROM THE "VITTLES VARIETIES," A SHOW STAGED AND PRESENTED BY AIRLIFT PERSONNEL.

SUMMARY

In both war and peace, a high degree of morale is indispensable if a military organization is to carry out its mission effectively. Unfortunately, this desired state of morale rarely exists unless advance planning recognizes the morale factor. Too often, advance planning neglects the special services program in the initial phase of operations. This is particularly true when operations are implemented under hurried conditions.

Provision must be made for a morale program to keep pace with other phases of operation. Adequate and qualified personnel must be assigned to organize and supervise the recreational program; materiel requirements must be anticipated and requisitioned; and appropriate physical facilities must be provided commensurate with personnel strength. Unit commanders should be oriented on the conditions of the area into which they are moving so that consideration can be given to transportation of recreational equipment with the unit if necessary.

Although the utilization of additional time and effort for morale and recreational planning may be at the expense of some other phase of the operations in the initial stage, the increased efficiency of personnel resulting from such planning will inevitably further the accomplishment of the mission.

AIRMAN INFORMATION AND EDUCATION ACTIVITIES

The Information and Education (I&E) Division of USAFE expanded its facilities to the utmost for the Airlift and experienced all the problems inherent in this type of enterprise. While its principal objectives remained the same — to provide commanders with personnel who were more competent on the job from every standpoint — the primary emphasis shifted from training to support of the actual operation.

INFORMATION PROGRAM

The I&E expansion program began with a TWX to all I&E Officers on 9 July 1948, requiring that they emphasize the importance of the Airlift in the AIP (Airman Information Program). Headquarters EUCOM was requested to publish a TI&E Bulletin on the Airlift and its significance and importance. Entitled "Operation Vittles" and subtitled "The Story of How Army and Air Force Cooperation Saved 2,500,000 Lives", the article was published 22 August in Volume III, No. 34.

The six-page illustrated account was distributed on the basis of 1 to every 15 Air Force personnel for use by discussion leaders during the regular AI&E hour. It showed the part played by each individual and emphasized his importance in the total endeavor. The cooperative support of the Airlift by the Army, the Air Force, and other participating agencies was explained in this article; and the principles, political implications, and policies of the Airlift operation were summarized. Congratulatory comments were inserted where appropriate to provide the occasional "pat on the back" so necessary to preserve morale in an arduous operation.

During the initial phase, information centers were established in response to the demands of pilots and crews for news on current events, particularly in connection with the Airlift. Pilot lounges were crowded with men who had little time to leave the base. Magazine and newspaper stands, maps, posters with the latest news, and an AI&E specialist were available in the briefing rooms to satisfy the demands of the aircrews for news. The AI&E specialist operated as a librarian, an information source,

and as a staff liaison representative, feeling the "pulse" of the Airlift personnel.

As the Airlift operation expanded, a shortage of trained I&E specialists made it necessary to discontinue the assignment of men to duty in information centers. But wherever possible, replacements were given orientation on the following subjects:

- (1) A review of the incidents which made the Airlift operation necessary.
- (2) The current political significance of the Airlift.
- (3) Future implications of the operation.
- (4) The relationship of individual responsibilities to the successful accomplishment of the mission.
- (5) The importance of the USAFE mission in supporting Military Government in the occupation of Germany.

In addition current events, especially those pertaining to the Airlift, were thoroughly discussed; and question-and-answer sessions were held. The orientation program prescribed for each installation by a USAFE directive dated 18 September 1948 was later supplemented to take care of the TDY personnel routed directly to Airlift bases.

The effectiveness of thorough indoctrination was repeatedly proved. The experience of I&E indicated that



TI&E INFORMATION CENTERS KEPT AIRLIFT PERSONNEL POSTED.

indoctrinations at replacement centers and at individual installations helped to control their morale problems, serious incidents, and VD rate. Replacements who were not thoroughly briefed on the Airlift added to the commanders' problems.

In October the type and number of questions encountered by air inspector and personnel services activities indicated the development of a potential morale problem. To meet the problem, the following actions were recommended:

- (1) An attitude research on morale at the four Airlift bases.
- (2) An information program to tell the men at these bases of the significance and importance of this new use of air power for peace.

The recommendation was approved, and work was immediately begun on an AI&E lecture incorporating answers to the complaints received.

To carry out the information program, a team of eight men was selected — seven airmen with a sales or education background, to present material to small groups, and one officer to supervise the presentation, to present the material to officers, and to act for the team in matters of scheduling and administration. The 7700th TI&E Group, Headquarters EUCOM, trained the discussion team and reviewed the material to be presented. Following a review of the plan, the TI&E staff school recommended that 30 minutes of the presentation be devoted to a lecture on the significance and importance of the Airlift, to be followed by a 30-minute question-and-answer period. Members of the team formulated questions, which were referred to USAFE Headquarters for answers to be used as a training aid.

After completion of a week of training, the team presented the revised talk to various staff AIP meetings on 20 November. The action was timely; for *Time Magazine* had just published an article entitled "Airlift Blues" which was being widely discussed. During the presentations at Headquarters USAFE and Headquarters 1st ALTF, the question period procedure was reversed,

and members of the team asked questions of the staff officers. This provided an excellent opportunity for obtaining answers to the questions which the team believed would be asked at the bases.

Prior to the visit at each base, commanders were informed of the program's details and were requested to arrange schedules for all personnel to hear "Operation Information," as the program was designated. To give every individual a chance to air his pet gripe, questionnaires were circulated among all participants in the orientation programs.

The questions submitted included every phase of the Berlin Airlift, from the number of pairs of socks available from quartermaster supply, to the extreme need for engine stands and other heavy equipment. Regardless of subject matter, an honest effort was made to contact every command source and every staff agency to obtain and provide definite and correct answers.

It can be readily seen that through "Operation Information," I&E faced problems never encountered in normal activity. To meet this challenge, every phase of the information portion of I&E activity during the Lift was planned as a service to personnel and an instrument for raising morale.

EDUCATION PROGRAM

In addition to adding to the effective ability of an airman, education provides him with a worthwhile pursuit for his spare time. What little off-duty time was available to Airlift personnel under the strain of their workload could have been misspent, without facilities for wholesome relaxation and self-betterment. The education program filled a great part of these needs. In general, the education program had three tools available to work with: correspondence courses of the U.S. Armed Forces Institute (USAFI), group study classes, and formal off-duty schools.

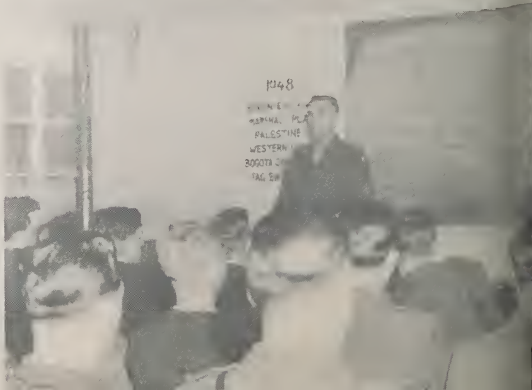
USAFI provided the most readily accessible educational opportunities for all personnel. It was necessary only to advertise thoroughly and to bring the facilities of

USAFI to the men. To accomplish this, AI&E officers at all bases were alerted to the need, and EUCOM was requested to divert as many USAFI trailers as possible to the service of personnel involved in the Airlift operation, wherever they were located. Headquarters EUCOM cooperated fully in every respect.

One of the first bases to be serviced by the USAFI trailer was Fassberg. During the first three days that the trailer was at Fassberg, a total of 96 courses were sold. The campaign was so successful that plans for moving the trailer were cancelled, and Headquarters EUCOM directed that the trailer remain as long as interest in USAFI continued high. Two weeks later the USAFI trailer was still selling courses at a very satisfactory rate. At that time 700 courses had been sold, a coverage of one-third of the personnel at the base. Rotation of this USAFI trailer was thereafter governed entirely by the interest shown at bases where the service was rendered.

Burtonwood, England, was faced with a situation peculiar to its mission in that the personnel stationed there, while subject to the same inadequacies and discomforts as those closer to the Airlift operation, were too far from its actual performance to feel the spirit and necessity for their efforts. The AI&E services described above were

THE EDUCATION PROGRAM INCLUDED WEEKLY "INFORMATION AND EDUCATION" LECTURES.



performed for Burtonwood as for other bases. In addition, one of the USAFI trailers which had been caught by the blockade in Berlin was dismantled, cut into pieces, and flown to Wiesbaden and thence to England. The tremendous response which this trailer received is indicated by the fact that the Commanding General, 3rd Air Division, requested in September 1949 that the trailer be kept in England.

Education centers providing off-duty classroom education were established at all bases. Through the use of non-appropriated funds and the cooperation of the 7700th T&E Group, EUCOM, trained civilian educational advisors were provided to assist AI&E Officers in monitoring the education programs. Fully realizing the need for these trained civilians, Headquarters USAF later authorized replacements paid from Air Force appropriated funds.

USAFE participation in the off-duty education program tripled during the period from July 1948 to January 1949. The great demand for educational facilities, added to the information problem, necessitated considerable expansion of I&E activities and personnel. Previous to the Airlift, all bases had operated with part-time I&E officers and an I&E non-commissioned officer. For the Lift, field staffs were augmented by a civilian educational advisor for each base, and necessary stenographic help was

provided. When commanders became fully aware of the service I&E was performing for them, at least one officer was assigned with I&E as a principal duty; in many cases more than one officer was assigned to the section. Most of these additional people were authorized on a temporary basis and have since been assigned to other duties.

SUMMARY

There were many lessons learned in AI&E during the Airlift. Important among these is that the American airman must be informed to perform his duties to the full extent of his capabilities. This makes an information service mandatory under the present-day concept of the tools of leadership.

AI&E must be prepared to furnish this information service at all echelons. However, its functions must be supported by commanders through provision of adequate personnel and facilities. At the beginning of the information program during the Berlin Airlift, commanders generally were under such pressure that all of their efforts were devoted to the operational phases of their problems. However, command support was forthcoming when it could be shown that a decreasing VD rate, higher morale, and increased efficiency resulted from adequate orientation of personnel.

The operation of an organized discussion period, where the individual could hear the answers to his questions and those of his friends, provided a constructive morale service.

PERSONAL AFFAIRS ACTIVITIES

In June 1948 the USAF Personal Affairs Program, as such, was not in existence. Post-war reductions in personnel and funds had necessitated the discontinuance of the program in mid-1947. Certain casualty assistance functions were assumed by the Chaplain, and all other functions were absorbed by other staff agencies. This decentralization of the program placed an extra burden upon the squadrons. Furthermore, specialists in matters pertaining to insurance, savings, allotments of pay, and family allowances were not ordinarily available at that level.

The circumstances under which large numbers of personnel were ordered to duty with the Airlift precluded proper personal affairs counseling prior to arrival in this command and created a hardship on individuals of the operational groups. As this situation grew more critical, every effort was made to procure trained personnel who were former personal affairs specialists; however, those obtained were often assigned other duties since no authority existed for a personal affairs office at group level. As a result sound personal affairs counseling by properly qualified specialists was not available.

As this situation became more obvious, Headquarters USAF announced in November 1948 that the Personal Affairs Program was to be re-established. With this advance information USAFE Regulation 34-4 was published 14 December 1948 to establish a Personal Affairs Program for USAFE. Personal affairs officers were appointed at all echelons down to and including group level, and the entire program in USAFE was monitored by what had been the Personal Assistance Section, USAFE.

By 1 February 1949 the effects of the establishment of this program were noticeable. Counsel and advice relative to personal affairs was available to Airlift personnel, and conscientious efforts were being made to solve individual personal problems.

The obvious lesson is that since the modern air task force is necessarily highly mobile, all Air Force personnel must continually maintain their personal affairs so as to permit movement to any part of the world with the least practicable delay. This can be accomplished by the continuation of the Personal Affairs Program.

AIR FORCE AID SOCIETY

An additional program monitored by the Personal Affairs Division was the Air Force Aid Society, which provides emergency funds for Air Force personnel. Air Force Aid sections were operational at all existing bases, and additional sections were established upon activation of new Airlift bases.

Although it is impossible to evaluate this program

TRAILER USED IN BERLIN.



properly, it is known that large sums were expended in other commands in rendering assistance to Airlift dependents. In addition, during the 12-month period from 1 August 1947 through 31 July 1948, approximately \$.096 per capita in Air Force Aid Society funds was expended for emergency aid in this command; and \$.137 per capita was expended during the following 12-month period. This increase in aid is believed directly attributable to the personal problems brought about by the Berlin Airlift.

Air Force Aid Society Sections should be established with other functions of a task force. In addition, it is suggested that Headquarters USAF arrange for periodic visits by the nearest Air Force Aid Society Officer to dependents who are separated from their sponsors, to render such counsel and financial aid as may be required. The satisfaction to the sponsor in knowing that the Air Force is interested in his family would be a vital morale factor.

RED CROSS

Though not a responsibility of the Personnel Services staff, the activities of the Red Cross are closely related to the Air Force personnel affairs programs, and are directly allied with the work of the Air Force Aid Society.

Red Cross field directors assigned to Airlift installations handled over 10,000 personnel cases during the operation. Their work involved a variety of services ranging from reports on health and welfare of military personnel and their dependents, and safety and first aid classes, to assistance in obtaining government benefits, transfer of funds, and actual emergency financial aid. Excluding the assistance given dependents in the U. S. or at Bad Mergentheim, Red Cross loans to Airlift personnel totaled \$12,000.

SAVINGS AND INSURANCE

To encourage participation of Airlift personnel in the Savings and Insurance Program developed by USAFE, plans were launched for a vigorous, continuing program to stimulate and maintain interest in savings and insurance.

Maximum NSLI coverage for all personnel was stressed. Reports indicate that 71.7 percent of the airmen assigned to the 1st ALTF were covered by NSLI in some amount; however, since figures were not available for the entire operation, no conclusions can be drawn.

SUMMARY

The problem of pre-set attitudes of Airlift TDY personnel, who had been hastily assembled from Air Force installations throughout the world, presented a unique challenge to personnel services officers of the Airlift.

Some of the Airlift personnel services officers were located at newly established bases with meager, overcrowded facilities. At the British zone bases, there was a definite difference of opinion between British and American personnel as to what constituted entertainment and recreation. Through compromise and tact on both sides, the problems presented were solved satisfactorily.

Theaters of a temporary nature were hastily constructed. Athletic programs were emphasized, and by the organization of intramural leagues on the various bases and the inclusion of Airlift bases in EUCOM-wide league playoffs, the athletic program was given impetus. A campaign of publicity was initiated to alleviate individual problems through the Air Force Aid Society.

Liberal pass policies were adopted to enable personnel to take advantage of distant recreational facilities. Whenever it was possible, base commanders were encouraged to provide transportation to and from leave centers.

An immediate program of orientation was initiated, though it was inadequate as a result of the confusing policies existing in commands from which personnel were drawn. A team of information specialists composed of commissioned and enlisted personnel was sent to Airlift bases.

Shows from the United States featuring top-rank artists toured Airlift bases to impress upon airmen the gratitude of the American people for the job they were doing.

Education through USAFI correspondence schools and off-duty classes was encouraged.

Snack bars were improved and rolling lunch wagon were established at the bases. Airman and officer club were enlarged. Off-base clubs were established where space was not available on the station, and bus service was provided in order to facilitate their use.

It was not until Airlift personnel were converted from TDY, or newly assigned on a PCS basis, that morale began to improve. Then, airmen and officers began to adopt an entirely new attitude toward their Airlift duties — an attitude which developed from a sense of well-being and security within the individual.

CONCLUSIONS

No personnel services program, no matter how thorough, can make appreciable inroads to supplant the feeling of insecurity felt by individuals as a result of improper orientation.

To insure a successful personnel services program in future operations similar to the Airlift the following should be provided each base:

- (1) An adequate personnel services staff.
- (2) A grant from the command central welfare fund to the base central welfare fund for incidental operating expense until distribution of regular central welfare funds can be accomplished.
- (3) Building space for a service club, including library, of 8,000 square feet, a 90'x50' basketball court, one complete portable boxing ring, storage for supplies 30'x30', an office and equipment issue room 20'x20', and 2,000 square feet for AI&E center.
- (4) Equipment and supplies for the service club, AI&E center, gymnasium, and for a balanced athletic program to include softball, baseball, basketball, archery, volleyball, tennis, handball, badminton, soccer, football, boxing, wrestling, hunting, fishing, skiing, and ice skating, as appropriate to the climate.

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RAF chaplains took care of the religious and counselling needs of American personnel at Fassberg and Celle until the arrival of American chaplains at those bases; but by October 1948, every Airlift base had adequate American chaplain coverage, with the exception of Rhein/Main. Whereas the personnel strength at that base rose from 2,000 to approximately 8,000 during the Lift, the number of chaplains increased only from two to three. This was an inadequate number for the workload imposed by the 24-hour base operation, which created a greater proportionate need for additional religious services and counsel periods.

A general idea of the increased chaplain activity at Airlift bases may be gained from the accompanying charts.



Had chaplains been requisitioned on the basis of existing needs and not on the basis of future contingencies, there would probably have been no shortage. As it was, three additional chaplains were needed at Rhein/Main to provide adequate services.

MORALE

It requires little imagination to picture the numerous personal hardships which evolved as a result of the sudden personnel changes incident to establishment of the Airlift. In addition, inability to foresee the duration of the Lift, and inadequate knowledge of its importance and its effects, made the men who were involved in its work

susceptible to innumerable morale problems.

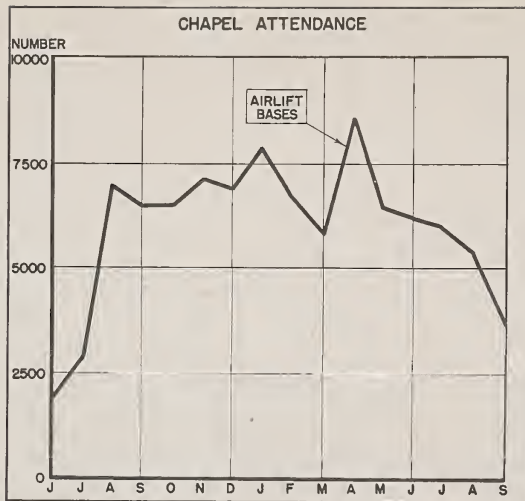
Some of these cases were solved through "morale leaves" which allowed the individual special leaves to handle his difficulties. To review applications for such leaves, some bases set up morale boards in which airmen participated. Though successful, the boards' effectiveness would have been greater if the final approval authority had been at base level. The responsibility for processing the application through higher headquarters in time for it to serve its purpose, was often left to the chaplain, which naturally limited his time and efforts in other fields.

Planning for chaplain work in a special operation involving factors similar to those in the Airlift should consider the following individual problem areas in which

the chaplain will probably be asked to give aid or counsel:

- (1) Difficulties arising from unstable dependent housing conditions - particularly if military personnel are moved from a location while their dependents are enroute thereto.
- (2) Marital and other personal problems caused by separation of families.
- (3) Financial problems originating in the adjustments incident to an unexpected change in status or location.
- (4) Personal problems of insecurity or loss of job interest due to inadequate orientation on the individuals' mission, on the relation of his mission to the total effort, and on his future status.

It is interesting to note in connection with the above that the correspondence to chaplains from relatives of Airlift personnel more than doubled when the TDY period was extended.



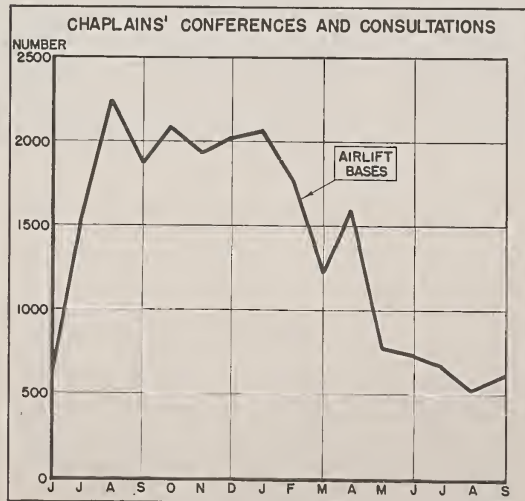
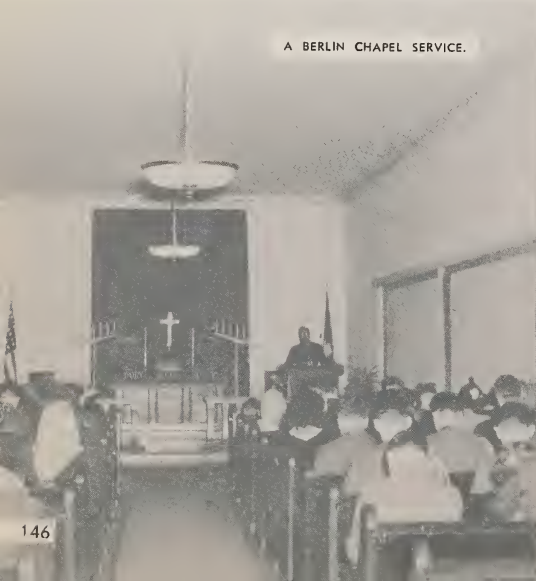
CONCLUSIONS

The experience of chaplains serving on Airlift bases indicated that unstable morale was principally due to:

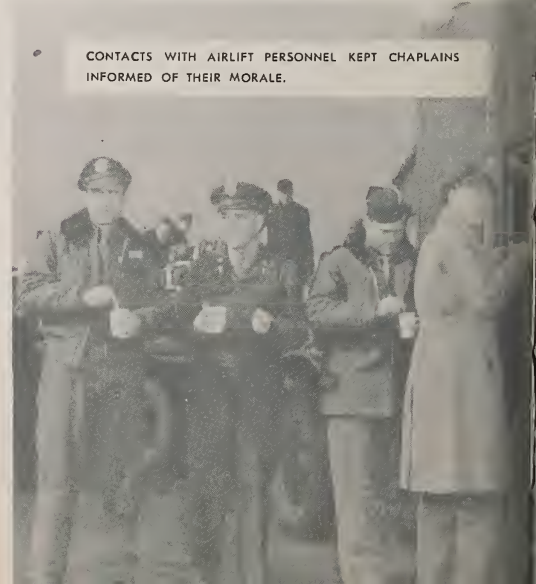
- (1) Ineffectiveness of orientation on the importance of the Airlift to the United States - European policy.
- (2) Lack of proper dissemination of information as to the effect of the Airlifts' continuation on the individual — extension of TDY, rotation policies, emergency leave, movement of dependents, etc.
- (3) Inability of the command to deal adequately with personal and family problems caused by the numerous unexpected changes in personnel assignment and location.

Chaplains' contacts with men permit them to obtain information of importance in connection with morale. To permit the full consideration of morale problems at policy levels, chaplains should serve as members of any morale boards established.

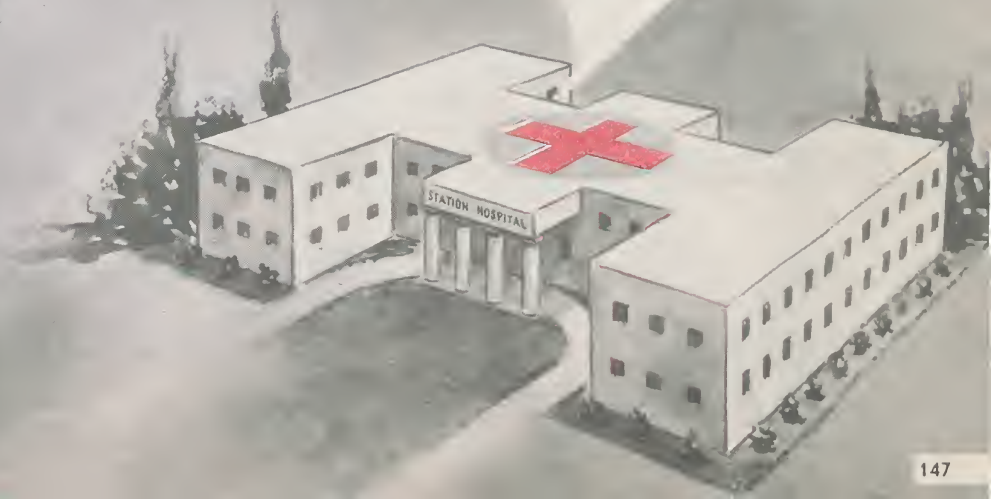
A BERLIN CHAPEL SERVICE.



CONTACTS WITH AIRLIFT PERSONNEL KEPT CHAPLAINS INFORMED OF THEIR MORALE.



AIR SURGEON

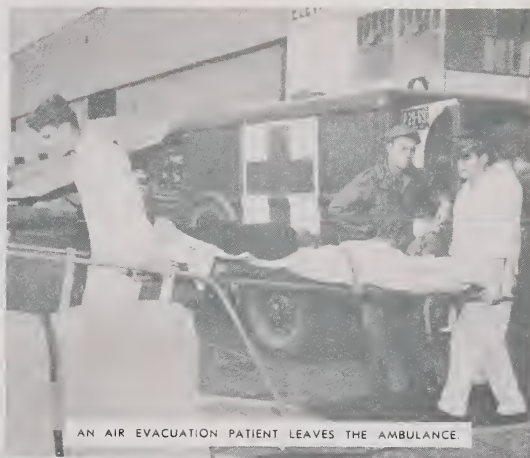


ORGANIZATION

PHYSICAL CAPABILITIES

Pursuant to theater policy, all Air Force medical units were under Army control and policy at the beginning of the Airlift. This had a direct bearing on Airlift health because the Air Force (with the exception of Wiesbaden Military Post) was allowed only dispensary level care. JAAFAR 1-11-50, which allowed hospitalization in Air Force units, was received in December 1948. However, the details of subsequent transfer of troop spaces, establishment of suitable T/O's, establishment of hospital funds, and the indoctrination of personnel in the proper procedures of hospitalization were of such magnitude that hospitals were not established and functioning during the Airlift. Due to distances involved, Celle and Fassberg were allowed to deviate from the theater policy of only 72-hour retention of patients, but even at these installations only limited hospitalization was possible. The disadvantages of dispensary level treatment were as follows:

- (1) Excessive time lost by individuals needing hospitalization, due to transportation and loss of individual patient identity in large medical installations.
- (2) Reference of patients with minor illnesses to quarters, when such individuals would normally have been hospitalized if suitable facilities were available. Retention in quarters of patients with respiratory diseases was epidemicologically unsound.
- (3) Inadequate Vital Statistics. Referring patients to hospitals rather than giving them care at station level resulted in loss to the Air Force, for medical statistics of a large number of personnel. In consequence, it was impossible during the entire Airlift operation to compute the rate of non-effectiveness due to disease and injury. The only accurate figures as to incidence of disease and injury came from the Care of Flyer Reports discussed in Section II below. The Care of Flyer Reports, however, did not reflect the health of the supporting troops except by inference.



AN AIR EVACUATION PATIENT LEAVES THE AMBULANCE



AN INTERIOR SHOT OF THE AIR EVACUATION CONSTELLATION.

HEALTH OF THE AIRLIFT

GENERAL

The statistics presented in this section were taken from the Care of Flyer Report (AF Form #203). To evaluate health of flying personnel with the Airlift, reports from Rhein/Main, Wiesbaden, Celle, and Fassberg were analyzed. Comparative statistics of non-Airlift flying personnel were taken from the reports of Furstenfeldbruck, Neubiberg, Erding, and Oberpfaffenhofen. Tempelhof, Tulln, and Landsberg were omitted from the analysis because their flying personnel strength was statistically unimportant. In addition, pertinent material is presented from a Flight Surgeon's Air Crew Questionnaire which was submitted to all Airlift air crew members 15 June 1949 and answered by 58 percent of the assigned personnel.

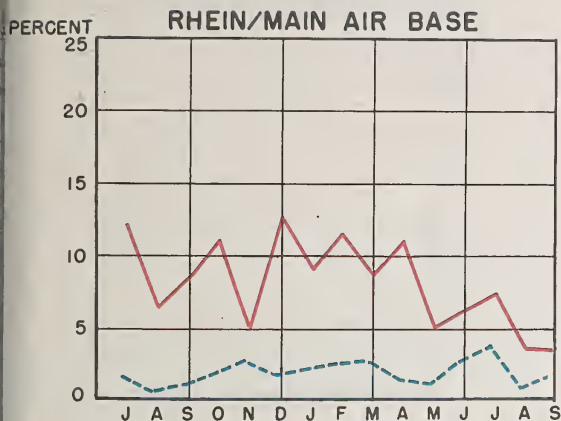
REMOVAL FROM FLYING

The number of Airlift personnel removed from flying because of disease or injury, as compared to non-Airlift personnel, was as follows:

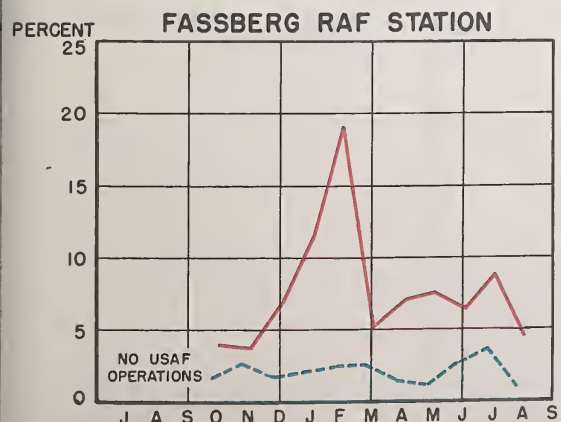
BASES	PERIOD OF REPORT	TOTAL PERSONNEL REMOVED FROM FLYING	AVERAGE STRENGTH OF FLYING PERSONNEL
AIRLIFT			
Rhein/Main Air Base	2 Jul 48 - 1 Oct 49	1,330	1,094
Wiesbaden Air Base	2 Jul 48 - 1 Oct 49	684	786
Fassberg RAF Station	1 Oct 48-28 Aug 49	614	700
Celle RAF Station	1 Jan 49 - 29 Jul 49	416	505
NON-AIRLIFT			
Furstenfeldbruck (Fighter Base)	2 Jul 48 - 1 Oct 49	136	316
Neubiberg (Fighter Base)	2 Jul 48 - 1 Oct 49	66	163
Erding	2 Jul 48 - 1 Oct 49	25	145
Oberpfaffenhofen	2 Jul 48 - 29 Jul 49	21	81

The percentage of personnel removed from flying each month at Airlift bases was approximately three to four

MEDICAL REMOVALS FROM FLYING



54	62	78	118	67	155	99	110	85	143	66	93	109	50	41
----	----	----	-----	----	-----	----	-----	----	-----	----	----	-----	----	----



				34	30	57	111	120	42	50	51	43	57	19
--	--	--	--	----	----	----	-----	-----	----	----	----	----	----	----

times greater than at non-Airlift bases, and during the winter months was generally in excess of 10 percent of the air crew strength, as compared to approximately 2 1/2 percent at non-Airlift bases. These percentages are expressed graphically in the accompanying charts. The percentages do not represent personnel **off duty** for the entire month, but rather the percentage of air crew personnel that were removed for various reasons during the period. There is no accurate method of computing time lost for individuals; however, a minimum loss of five days is a conservative estimate.



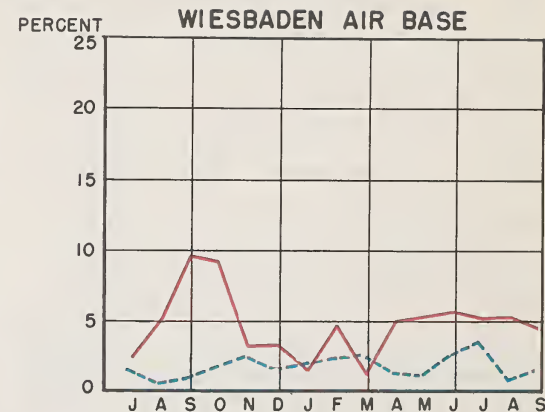
LEGEND

AIRLIFT

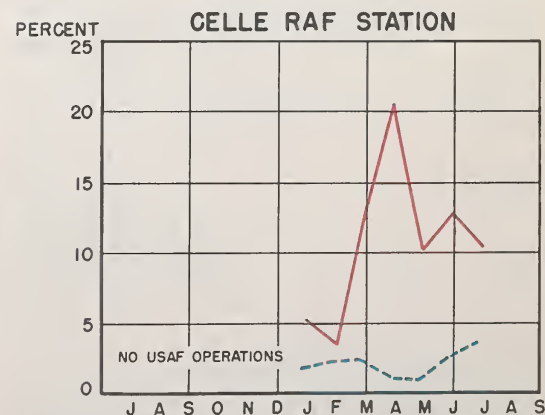
NON-AIRLIFT

REMOVALS AT NON-AIRLIFT BASES

NUMBER	12	7	10	16	22	15	19	23	24	14	12	22	27	9	16
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S

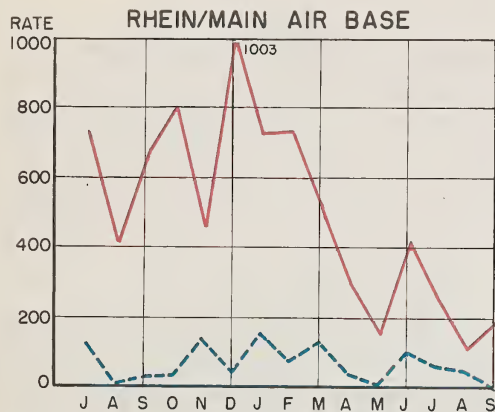


16	60	79	62	22	23	13	31	55	52	50	55	49	47	20
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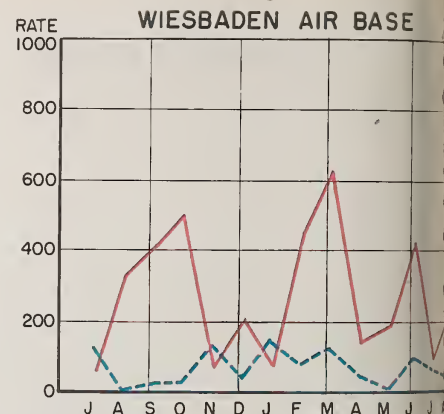
								19	15	75	126	56	69	56	
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REMOVALS FOR RESPIRATORY DISEASES

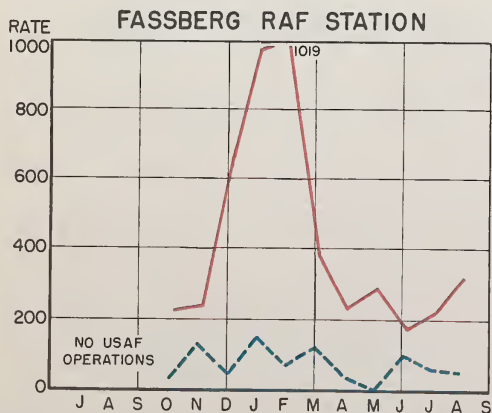


AIRLIFT REMOVALS	24	30	46	63	44	93	59	52	39	37	16	46	38	11	20
---------------------	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Common respiratory disease and its complications was the predominate cause of removal from flying. The number of Airlift personnel removed from flying because of respiratory disease alone was excessive, being about five times higher than at non-Airlift bases. The rates of removal for respiratory disease of Airlift personnel, as compared to non-Airlift personnel, are shown in charts below. These rates do not include such complications as aero-otitis (236 removals), aero-sinusitis, etc.



AIRLIFT REMOVALS	3	27	25	25	4	11	5	21	21	14	14	31	9
---------------------	---	----	----	----	---	----	---	----	----	----	----	----	---



AIRLIFT REMOVALS				17	17	40	73	89	23	16	15	9	14	10	
---------------------	--	--	--	----	----	----	----	----	----	----	----	---	----	----	--



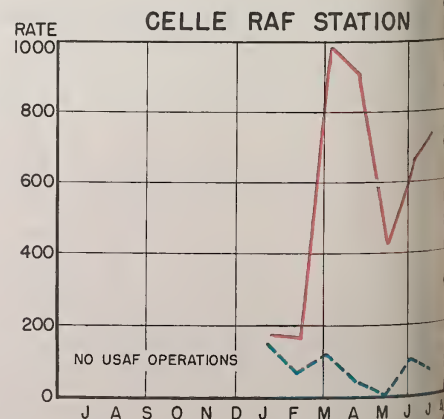
AIR FORCE, NAVY, AND GERMAN DOCTORS STAFFED THE
RHEIN MAIN DISPENSARY. [REDACTED]

LEGEND

AIRLIFT

NON-AIRLIFT

REMOVALS AT NON-AIRLIFT BASES															
NUMBER	6	1	2	3	8	4	9	5	8	4	1	6	5	3	1
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S



AIRLIFT REMOVALS						5	5	42	53	18	27	37
---------------------	--	--	--	--	--	---	---	----	----	----	----	----

AIR EVACUATION

Airlift personnel stationed at Celle and Fassberg who needed hospitalization were originally evacuated to the 97th General Hospital by train or by base aircraft, and in emergencies were sometimes hospitalized in adjacent British medical installations. This method was unsatisfactory due to excessive time lost during rail transportation and because non-scheduled air evacuation frequently resulted in aborted missions, delivery of patients to the wrong destinations, and other irregularities. In March 1949 scheduled air evacuation flights, with air crews containing a flight nurse and other Medical Department personnel, were inaugurated on a bi-weekly basis to evacuate patients from Celle and Fassberg. This procedure continued until the termination of the Airlift. There was no incidence of air evacuation aircraft accidents or of loss of patients in flight. The total number of patients evacuated are tabulated as follows:

MONTH	PATIENTS	TOTAL PATIENT MILES FLOWN	TOTAL AIR EVACUATION HOURS
March	51	12,934	67
April	109	27,985	191
May	149	37,349	282
June	103	29,842	180
July	121	31,086	183
August	77	21,042	140
TOTAL	610	160,238	1,043

OPERATIONAL FATIGUE

During the period of the Airlift 28 crew members were removed from flying because of operational fatigue, as compared with no removals for this cause from other USAF bases. There is no method of measuring the amount of sub-clinical fatigue or the number who sought relief from flying because of fatigue under the guise of other symptoms.

MISCELLANEOUS

While respiratory disease was excessive and fatigue was a considerable factor, other disabilities did not materially deviate from USAF or theater averages. The total removals during the period of the Airlift for the more common disabilities were as follows:

Cause	Wsbm AB	R/M AB	Fassberg	Celle	Total
Pneumonia	2	6	3	1	12
Tuberculosis	1	3	0	0	4
Infectious Hepatitis	9	9	2	3	23
Peptic Ulcer	6	7	1	1	15
Appendicitis	9	5	2	0	16
Hemorrhoids	13	5	1	4	23
Hernia	1	1	1	0	3
Skin Diseases	12	41	3	6	62
Aircraft Injuries	7	4	8	3	22
Totals	60	81	21	18	180

CAUSES OF DISABILITIES

RESPIRATORY DISEASES

Over-crowding is considered the single most important reason for the excessive respiratory rate. During the winter of 1948 and 1949 a large number of air crews averaged 50 cubic feet or less housing space per individual, as contrasted with the minimum requirement of 72 cubic feet. At that time respiratory disability bordered on the vicious

cycle stage, where replacements for the disabled would add to the over-crowding and intensify the dissemination of disease. Absence of any serious disabling epidemic, such as influenza, allowed the Airlift to continue.

In the medical questionnaire comments of air crew members there were numerous complaints of cold barracks. The lack of heat in turn led to keeping windows closed at all times, thereby further spreading respiratory diseases.

During inclement weather there were frequent occasions of inadequate shelter. A typical example was the turn-around operation at Tempelhof and Gatow, wherein crews would stand in the rain to get their coffee and sandwiches.

Schedules were such that many meals had to be eaten at snack bars or line messes. Preserving proper nutrition was difficult.

The initial 5,000 troops who arrived to participate in the Airlift saw a concomitant arrival of only one medical officer. This put a severe strain on USAF medical personnel which was slowly rectified as additional Medical Department personnel arrived. Shortages of doctors made it almost impossible for a crew member to see a Flight Surgeon without a period of waiting. Therefore, early symptoms were neglected, and many of the prophylactic measures such as medication of early colds were impossible to effect.

Completed questionnaires contained frequent remarks to the effect that cockpit heating was inadequate, either being too hot or too cold, and that proper temperature regulation was impossible.

MAKING A BLOOD COUNT.



FATIGUE

In the Flight Surgeon's Questionnaire, schedules were considered unsatisfactory by over 75 percent of the crew members. Scheduling was largely left to the various squadrons with the result that there was a wide variation. The schedule of 12 hours on duty and 24 off used by several squadrons appeared to be particularly undesirable as there was continuous alteration between day and night duty, allowing little time for adjustment. In all schedules the hours worked were almost always in excess of those scheduled.

The existing medical facilities of a command cannot maintain proper medical standards when there is a sizeable increase in troop strength. Medical components should accompany major troop movements.

During a continuous operation, lack of guidance and uniformity in scheduling will lead to the establishment of routines that contribute to fatigue and lessen resistance to disease. Schedules should be uniform, allowing sufficient time off for recreation and attention to personal needs, and shifts should not be changed at intervals of less than seven days in order that individuals may adapt to change

in sleeping habits.

Individuals sleeping during days suffer constant interruption if billeted with individuals on other shifts. Segregation of day sleepers is essential to their proper rest.

Concern over families; especially in regard to housing, contributes to fatigue and lowers effectiveness. Suitable family housing in a non-combat operation is essential to air crew adjustment.

In a continuous 24-hour-a-day operation, night crews have difficulty in procuring regular hot meals, a condition which in turn compromises their nutritional status and resistance to disease. Under such circumstances messes should operate on a 24-hour-a-day basis and meal times adapted to the schedules.

Lack of temporary shelter, with resultant exposure, contributes to the respiratory rate. Temporary shelter at bus stops, at loading and unloading sites, and at outdoor areas near mess halls and theaters should be included in construction plans.

Exposure to coal dust and lack of suitable bathing facilities results in a rise in incidence of skin disease. In a continuous operation, an adequate supply of hot water

for troop needs should be provided.

In an operation of major magnitude requiring extraordinary effort on the part of participating personnel, there is a law of diminishing returns where losses through fatigue and disability increase faster than productive results. A comparative study of troop disability and operational returns should be made to determine at what point proportionate returns diminish.

Among other causes for air crew disabilities, two factors are worth mentioning:

- (1) There was a moderate increase in diarrheal rate as a consequence of over-crowded messes.
- (2) There was a moderate increase in incapacitating skin conditions in which inadequate hot water in barracks and coal dust in planes were contributing factors.

CONCLUSIONS AND RECOMMENDATIONS

HOSPITALIZATION

Dispensary level medical care at large Air Force bases, especially when engaged in an active and important flying mission, is inadequate for proper medical support. The planning phase of any major Air Force operation should include the establishment and construction of Air Force hospitals of a size compatible with troop strength.

AIR EVACUATION

Scheduled air evacuation is superior to on-call flights originating at the bases concerned, and should be included in preliminary planning.

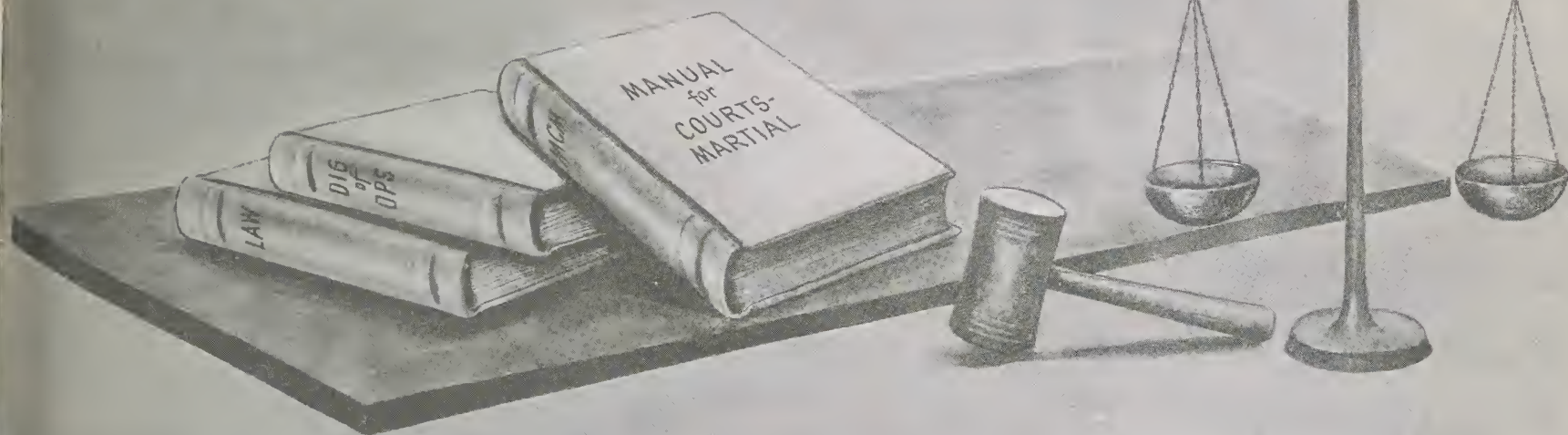
PHYSICAL DISABILITIES

When a troop population is established in excess of existing facilities, a rise in physical disabilities can be expected. Construction of adequate housing prior to occupancy is essential to proper troop health. Construction to meet the population needs after occupancy is a less suitable alternative.



RESPIRATORY DISEASES OCCASIONED MOST REMOVALS

AIR JUDGE ADVOCATE



Creation of the Berlin Airlift gave rise to many problems in military justice, military affairs, and allied legal matters. Because of the non-availability of qualified, legally trained personnel, Headquarters 1st ALTF could not perform the functions necessary for the efficient operation of courts-martial. For this reason, it devolved upon Headquarters USAFE to provide facilities and personnel to absorb the functions associated with the exercise of general courts-martial jurisdiction. Officers with little, if any, previous civil or military legal experience were integrated into legal duties. After a period of accelerated on-the-job training at Headquarters USAFE these officers, supplemented by regularly assigned legal officers, were distributed throughout the command to achieve effective and expeditious administration of legal and justice affairs.

While the presence of Airlift personnel caused no appreciable pro-rata increase in courts-martial, the trial and processing of additional cases required the frequent presence of regularly assigned Judge Advocates and the constant attention to, and supervision of, proper processing of such cases by other assigned personnel. Difficulties of communications and transportation and absence of Airlift personnel from legal proceedings resulted in many unusual delays.

An additional workload was imposed by the necessity for consideration of arrangements for the use of air fields under the jurisdiction of friendly nations. In frequent instances, consultations with British and French officials were required in order to reach agreement on respective obligations and benefits.

Other legal problems developed as a direct result of the rapid transfer of personnel to assignments with the

Airlift. Legal aid was provided to adjust difficulties arising from sales and purchases of real and personal property, leases, mortgages, contracts, and probate affairs. Advice was also given on personal problems connected with divorce, separation, support and custody of children, and similar troubles. Alleviation of these causes of irritation and anxiety, it is felt, eliminated many potentially serious disciplinary problems.

Operation of the Berlin Airlift helped point out that many personal problems requiring legal aid and advice manifest themselves when large numbers of personnel are added to a command or transferred within the command. Effecting a solution to each problem emphasized that military legal administration must be flexible enough to adjust to any unusual demands made upon it, and that the Judge Advocate must constantly be ready to render advice on transfer of legal personnel as needed.



BRITISH CHECK POINT.

U.S. CHECK POINT.

RUSSIAN CHECK POINT.

HELMSTADT ZONAL BORDER TRAFFIC CHECK POINT.

BEVERLY HILLS
The New York Times.

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NEW YORK, SUNDAY, SEPTEMBER 19, 1948

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USAF Delivers Record
to Berlin in

WILDCAT WALKOUTS
EXPECTED TO GROW
AS STEEL IS SILENT

ATOM CONTROL PUT
TO U. N. BY ROMULO
AS A 'MUST' ISSUE

Week-End Lag in Negotiations
Marked by Reports Union

Lilienthal Says U. S.
Not on Atom

SOME ACTION ASKED

Most of Small Nations
Steel Assembly Should
Reopen Question

AGENCY SUGGESTED

The Philadelphia Inquirer

San Francisco
MORNING JOURNAL
SUNDAY, JANUARY 16, 1949
FIFTEEN CENTS

AF Flies Millionth
Chicken City

San Francisco City
THE CITY'S ONLY HOME-OWNED NEWSPAPER
SUNDAY, JANUARY 16, 1949
FIFTEEN CENTS

Class of Jurors
Become Peril
INSTRUCTIONS
JURY ASKS NEW
Court Aid Requested Third Time
in Long Deliberation
U. S. Drafting
New Policy
Tito Isolates
Lift Hauls 12,940
TONS

CLEVELAND PLAIN DEALER
SUNDAY MORNING
APRIL 11, 1949
FIFTEEN CENTS

The Dallas Morning News
Dallas, Texas, Sunday, November 7, 1948 - 130 PAGES IN 7 SECTIONS - PRICE 15 CENTS

SCORES
CIO Retards
Left Winger

THOSE POOR OLD PUMPKINS
EXPECTED TO GET IT AGAIN
Weather forecasts called for more frost on the pumpkins
last Sunday morning, as the string of clear, chilly
days and cold nights...

Preside
For Leh

man's Report on Serfdom in the Soviet Union
NEW YORK
The American Newspaper Editors
PARIS, TUESDAY

They Will Be Assembled Here, Then Flown Over
ATS

The Evening News
LONDON, TUESDAY, JULY 20, 1948
ONE PENNY

U.S. 155

The public relations aspects encountered immediately preceding and during the Berlin Airlift were unique. From the role of an occupational Air Force, USAFE suddenly became a major factor in a crisis affecting the security of millions throughout the world. The public world-wide demanded a complete and accurate account of the developments and implications of the Airlift. To satisfy these demands, and to efficiently discharge other phases of the Public Information mission, it was necessary to create an expanded PIO net capable of swift dissemination of facts, anticipation of developments, and satisfying the ever increasing demands of the press.

PRELUDE

Months before the blockade was imposed, as the international and political situation between the Western nations and the USSR began to deteriorate, additional Public Information personnel authorizations were requested. As the tension between the occupying forces in Germany mounted, the number of press releases in the theater rose sharply. Proportionately the personnel requirements of the Public Information Office increased.

An 18 percent addition to the USAFE Headquarters PIO staff early in 1948 improved the situation considerably. Later in the year, rumors and careless talk, originating with military personnel and their dependents, resulted in a sharp rise in the number of dependents returning to the United States. The press, attaching considerable significance to this action, filed numerous stories which contributed to a war "scare" within the United States. The reaction of relatives requesting return of dependent personnel added considerably to the public relations problem and for a time the situation was without a positive solution.

During this period the PIO was primarily concerned with easing the tension of dependents in order to relieve pressures which interfered with the overall military efficiency of USAFE. To implement this, measures were taken to minimize the cause of the anxiety. Meanwhile the accelerated training of new personnel, both at base

and headquarters level, continued.

A crisis in the Berlin situation occurred 5 April 1948 when a Russian fighter crashed into a British airliner over Berlin. U. S. fighter squadrons were alerted, to escort cargo and passenger aircraft through the corridors unless a satisfactory assurance could be obtained from the Russians that U.S. and British aircraft would be unharmed. On this date the Public Information Office began functioning on a 24-hour basis, and hundreds of press inquiries were handled.

THE BLOCKADE

Correspondents from Allied nations throughout the world began arriving in the Zone in quest of spot coverage of Airlift activities. The number of press inquiries handled by Headquarters PIO mounted daily. Public Information personnel were declared critical, and qualified officers were requisitioned from the United States. In the meantime Public Information officers and photographers from USAFE bases not concerned with the Airlift were ordered to duty with Headquarters USAFE. During this period it was necessary to shift to longer duty hours, occasionally extending to a 24-hour operation.

Before the Airlift was a week old, Soviet-controlled German newspapers were flooding Germany with propaganda emphasizing its futility and accusing the Allies of creating false hope for Germans in the western sectors of Berlin. These papers ridiculed USAFE announcements of increased tonnage and portrayed the operation to the Germans as a token gesture. The German people, so susceptible to propaganda and distrustful of anything represented as being in their interest, accepted this ridicule as fact.

On 30 June the Commanding General, USAFE, approved a plan permitting German correspondents, photographers, and radio commentators to fly aboard Airlift planes for a period of one month and thus give eyewitness reports directly to the German people. Within a week, German reporters from all news media of consequence in the U.S. Zone had observed that the United States was doing everything within its power for the people of

western Berlin. This action primarily benefited the position of the U.S. Government by severely shaking the convictions of the reading public of the Soviet-sponsored press.

In October 1948 the USSR announced that Russian fighters had been ordered to force down any aircraft exceeding the 20-mile confines of the corridors leading into and out of Berlin. So great was the belief that this action would touch off the delicate situation that a leading wire service dispatched a reporter to full time duty in the Public Information Office of Headquarters USAFE to insure a scoop on the initial report of air hostilities.

With the approach of winter, new factors requiring PIO attention developed. There were questions in the minds of the press and public that were yet to be answered. Could the Airlift continue through the low ceilings and fog of a European winter to supply sufficient food and coal? Was it possible to do it even under ideal conditions? Would the morale of the Airlift men be seriously affected by the hardships they were enduring? Were the planes wearing out? Would the Soviet interfere? In short, would the Airlift fail?

The Soviet-sponsored press thought it would, and so did some of the aviation experts. In November the Commanding General of USAFE announced, "The Airlift Task Force can and will continue to supply Berlin just as long as necessary, regardless of weather or Soviet interference."

PLANS

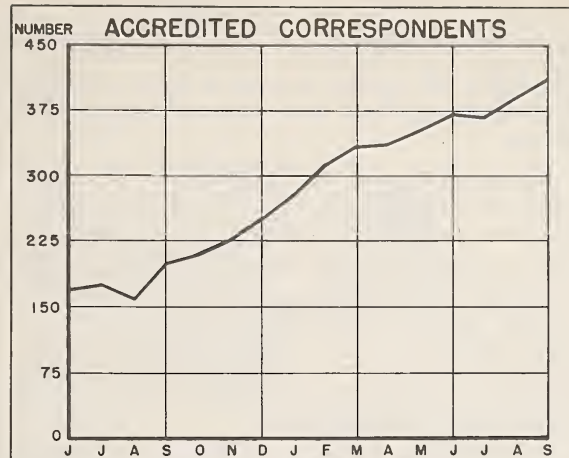
To convey most forcefully and effectively to the American people the story of the United States Air Force in the Airlift, the Public Information plan called for a shift of emphasis from the preparation of handout material to devoting a maximum of attention to the individual newsmen and representatives of all media. Stress was placed on making every minute of a visiting correspondent's time count. This could not be implemented fully until sufficient trained personnel became available late in the year. At the peak of the Airlift, approximately 60 percent of the PIO staff were working full time escorting or directly assisting correspondents by furnishing Air Force information or by organizing facilities for their report on the

operation to the world public.

In the furtherance of this plan the Commanding General, USAFE, approved a recommendation that United States and Allied newsmen be permitted to fly aboard Airlift freighters into Berlin and gain first-hand information on the operation. Newsmen accompanied an estimated 2,000 flights. Special tours and briefings were given the permanent press and correspondents visiting Germany under the auspices of the United States Air Force. In addition, the Public Information Office arranged tours and briefings for numerous other groups.

At the request of the State Department, tours were arranged for distinguished visitors of the western nations. Frequently members of the foreign press were included, and on occasion civic groups from the United States were conducted on these tours. Typical of these were the United Nations Press Corps, the U.S. Junior Chamber of Commerce Delegation to the World Conference, and occasional smaller groups of U.S. citizens who represented only the normal interest of the American taxpayer in the performance of his Air Force. No accurate estimate of the thousands of persons who saw the Airlift in operation can be made.

The PIO plan for Airlift publicity contemplated that the lift operation would be "open" for inspection 24-



hours a day; consequently, restrictions on U.S. or Allied visitors to Airlift bases were kept to a minimum commensurate with operational requirements. On occasion, Lift bases were opened to the German civil population; this caused the Soviet-sponsored German press considerable embarrassment and resulted in increased efforts on the part of German laborers employed on the Airlift.

The smooth function of the Army-Navy-Air Force Team and the splendid cooperation achieved by French, British, and American units were the highlights of the Airlift from the standpoint of Public Information.

PROBLEMS

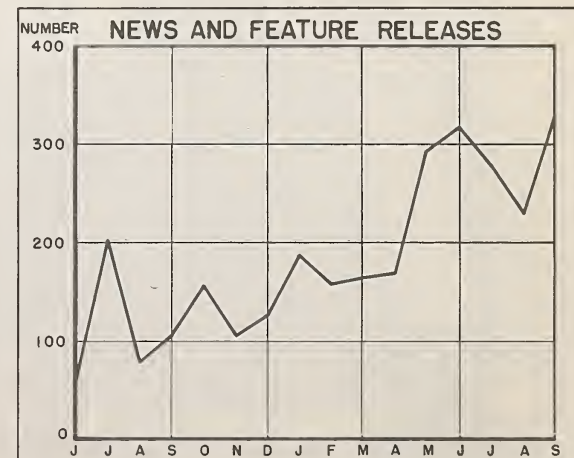
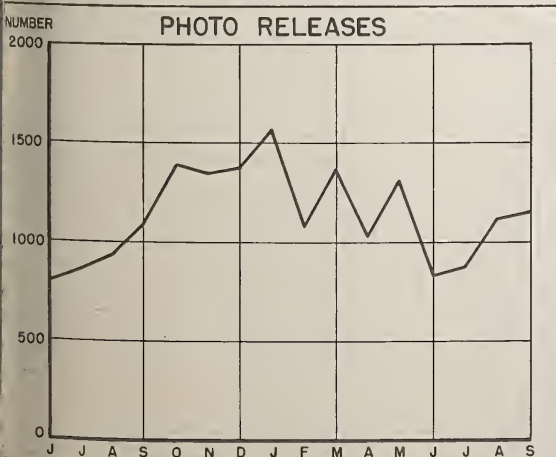
Lower Echelon Cooperation. The PIO program was not without minor internal problems. The Combined Airlift Task Force was never able to develop an efficient system of furnishing information of a Public Information nature to USAFE. Frequently it was difficult to secure accurate routine information for release to the press from the CALTF Headquarters PIO due to a somewhat formidable system of clearance enforced within that Headquarters. This handicap was overcome to a great measure by USAFE Head-

quarters personnel but at the expense of additional man-hours.

Personnel. The major problem confronted by the Public Information Office of USAFE was a lack of qualified PIO personnel in the early days of the Airlift. It was several months before personnel began to arrive through the pipeline. During this period all qualified PIO's worked 12 to 18 hours a day including weekends. Even this schedule was insufficient.

The problem of being confronted with a public relations situation overnight, far beyond the capabilities of a command organization normally staffed, is one that should be anticipated. A crisis of this nature can focus world-wide attention on the local capability of the United States Air Force; therefore, public relations must be given immediate attention to insure complete and accurate dissemination of all facts of the situation.

When the greatest Air Force story in peacetime broke, it took too long for PIO help to arrive. One possible solution would be to increase the flexibility of the entire USAF PIO organization so that qualified personnel could be quickly assembled and dispatched on TDY where they were needed in a matter of a few days or hours. The plan adopted within USAFE of calling in PIO personnel from



non-Airlift bases to augment the permanent personnel at the hot spots was highly satisfactory. Such a plan could conceivably work on a larger scale involving commands.

Lack of Motion Picture Facilities. The Airlift created many situations particularly favorable to newsreel type coverage. On several occasions USAF sent motion picture camera teams to cover specific aspects of the Lift. However, it is believed there was ample material to have warranted a full time Air Force motion picture cameraman on duty within the Zone. Headquarters USAFE had re-

quested the assignment of a motion picture cameraman from USAF as early as August 1948 for the duration of the operation, but unfortunately this request was not granted. It is believed the Lift publicity program would have been more effective had there been additional newsreel type coverage.

Correspondents Arriving Unannounced. Throughout the Airlift, the effectiveness of the PIO system of handling USAF-sponsored correspondents visiting the Zone was diminished because in many cases prior notification of the arrival of a correspondent was never received. When this occurred the correspondent could not be met or properly briefed regarding Air Force activities. Frequently these correspondents would proceed to the nearest Army Press Center, and several days would pass before USAFE would learn of their presence in the Zone.

With each correspondent operating on a strict time budget, this delay necessitated a rushed tour of Airlift bases which invariably omitted many important phases of Air Force activity. A substantial loss of potential Air Force publicity was entailed. Repeated efforts to emphasize the necessity of prior notification from Hq. USAF resulted in only temporary successes.

SUMMARY OF COVERAGE

Correspondents sponsored by the USAF were flown to Germany and shown all phases of Airlift activity. Their observations and reporting, augmenting that of the permanent press group, brought the accomplishments of USAFE and the RAF into the daily lives of people everywhere.

One wire service alone reported filing an average of 100 words per day on the Airlift over a period of 15 months. This service has approximately 2,500 newspaper and radio subscribers world-wide and reaches an estimated 60,000,000 readers in the United States.

The Public Information Office, USAFE Headquarters, produced more than 900 news releases and 15,000 photographs on the Airlift operation. Radio and television media representatives were periodically escorted to all Lift installations. Many motion picture shorts and one full-length feature picture based on the Airlift were made, in addition to weekly newsreel coverage. Fortune, Life, Saturday Evening Post, and many others of the so-called "slick" magazines carried Airlift stories at one time or another. National Network broadcasts were made frequently from Berlin and Frankfurt throughout the operation.

A USAFE Public Information Liaison Officer was assigned to the Berlin Press Center in December 1948 to assure that correspondents and observers seeking Air Force information received full cooperation while in the blockaded area.

Thoroughly briefed in advance, this officer arranged and scheduled the correspondent's itinerary prior to his arrival to include all aspects pertinent to the type of story or information he was seeking. This officer additionally served as official USAFE spokesman to the Berlin press and advised Headquarters USAFE PIO of their interests and of four-power developments in Berlin in advance of normal channels.

The Airlift public relations program officially terminated on 31 September 1949 with the last Airlift flight into Berlin. Several minor PIO projects concerning the operation still linger, but they are no longer considered the primary mission of USAFE's Public Information activities.

ED ON 8
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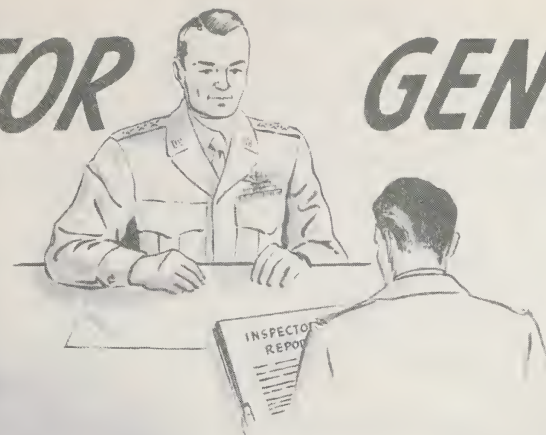
ESTIMATE
PERSONNEL.

LT. GEN. JOHN K.
THAT CALIF PLANES
OF SUPPLIES INTO
MORROW.

AS OF FEBRUARY 1ST WAS \$106,750
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TON.

IMATELY 335,000 TONS HAVE BEEN
D 77,000 TONS HAVE BEEN OF

INSPECTOR GENERAL



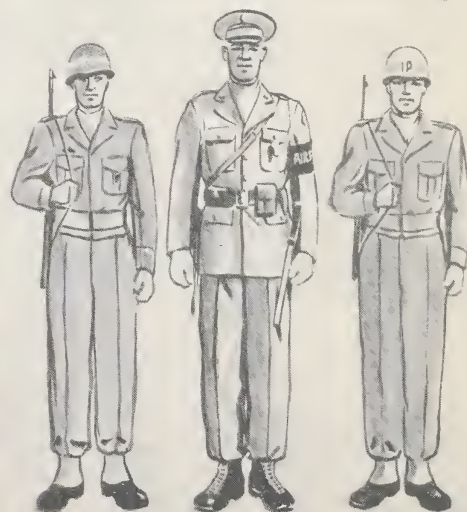
AIR INSPECTOR



COMMANDING
OFFICER



AIR PROVOST MARSHAL



AIR INSPECTOR

FUNCTIONS

The mission of the USAFE Air Inspector, as contained in Air Force Regulation 123-1, 24 June 1948, is to:

- "(1) Inquire into and report upon all matters affecting the tactical, technical, logistical, and administrative effectiveness of the Air Force and the efficiency, economy, and adequacy thereof.
- (2) Keep appropriate commanders informed on the current status of matters and conditions affecting accomplishment of the command mission, including the status of training and readiness for combat of units, crews, and individuals of their commands; and the causes and results of aircraft accidents and other deterrents to successful accomplishment of flying missions.
- (3) Provide a facility through which personnel may personally present to an inspector their questions and grievances without prejudice.
- (4) Assist commanders and their personnel in performance of their duties by supplying information when appropriate, by suggesting ways and means of improving practices and procedures, and by recognizing and reporting meritorious conduct."

No augmentations or deletions in this mission were made during the period of the Airlift.

ORGANIZATION

During the Airlift the Air Inspection Division, Headquarters USAFE, was staffed under the Inspector General as directed by the regulation mentioned above. At those stations involved in the Airlift, the Wing-Base Air Inspection Sections were staffed under authorized Tables of Organization and Equipment and functioned as directed by AFR 123-1.

OPERATION

The first formal air inspections by a higher headquarters of Airlift activities were Survey Inspections conducted by the Air Inspector, USAF, at Rhein/Main and Wiesbaden Air Bases, at Erding and Oberpfaffenhofen Air Depots and at three other USAFE non-Airlift units, during the period 16 September-4 October 1948, prior to completing the Annual Air Inspection of Headquarters USAFE. The Air Inspector, USAF, reported:

"Inspection coverage by the Air Inspector, Headquarters USAFE, is considered thorough and adequate. However, the inspection system at base and wing level is considered weak due to a lack of qualified personnel."

The USAFE indorsement thereon to the Chief of Staff, USAF, stated:

"Every effort is being made to obtain qualified inspection personnel for base and wing level. However, the experience level of inspection personnel will drop considerably unless qualified replacements are furnished from sources within the Zone of the Interior during this fiscal year."

With the increased Airlift commitments and addition of two air bases in the British Zone, inspection requirements increased immensely. Established practices and procedures had to be improved to cope with supply demands. This action was taken by the Command and Staff Sections of Headquarters 1st ALTF. These sections continually conducted extensive staff visits and inspections to effect compliance and improve procedures. Operations and Training inspections by air inspectors at wing-base level were practically non-existent due to shortage of qualified inspectors. The problem of acquiring adequately trained personnel for all duties, including air inspectors, was acute.

The USAFE Air Inspector was completely occupied with Annual Air Inspections of Tempelhof, Rhein/Main, and Wiesbaden Air Bases during the period 19 October-10 December 1948. Airlift operations were directly supported administratively and logistically from those air bases; however, simultaneous inspections of the tactical operation or functions of the tenant Airlift organizations were not

made at that time. The adequacy of inspections and reports completed on these supporting air bases revealed that a major portion of the recommendations contained therein, and the follow-up action by successively higher echelons of command on irregularities and deficiencies reported, aided materially in the overall accomplishment of the Airlift mission.

As a result of the Annual Air Inspection of Wiesbaden Air Base, a letter was sent to the Commanding General, 1st ALTF (for Airlift tactical units) and to USAFE wing-base commanders, directing utilization of wing-base air inspectors to conduct complete quarterly inspections of all tenant activities operationally assigned to 1st ALTF. This action resulted in closer coordination between tactical units and base activities and, further, the results reduced duplication of critically short inspection personnel and relieved a tense situation developing between tactical units and wing-base air inspectors.

By February 1949 trained air inspection personnel had arrived from the ZI in numbers adequate to staff an Air Inspection Division at Headquarters 1st ALTF and to assign qualified air inspection personnel to the wing-base air inspection sections at authorized T/O strength. In late February the Air Inspection Section of the Task Force began to function. Survey Inspections were conducted on Airlift units at Rhein/Main, Celle, Wiesbaden, and Tempelhof Air Bases during February and March 1949. In March Headquarters USAFE delegated Annual Air Inspection responsibility to Headquarters 1st ALTF for units of that command.

The 1st ALTF Air Inspector was primarily concerned with the Annual Air Inspections of 1st ALTF units located at Wiesbaden, Rhein/Main, Celle, Fassberg, and Tempelhof Air Bases during the period 1 May through 30 July 1949. The results of these initial Survey Inspections indicated that there was much to be desired insofar as adequacy and qualification of air inspection personnel at the base level, and the effectiveness of air inspection. Among other matters reported was a case report on the acute shortage of wing-base air inspection personnel at one station. Headquarters 1st ALTF immediately took action to

fill this requirement. While Headquarters CALTF occupied the same physical location as Headquarters 1st ALTF and certain staff divisions had British elements, the 1st ALTF Air Inspection System was never extended to cover combined operations.

SPECIFIC PROBLEMS

The Annual Air Inspection of Headquarters 1st ALTF was conducted by a team of air inspectors under the USAFE Inspector General during the period 15 March - 15 April 1949 and was preceded by complete Survey Inspections of all Airlift bases. This inspection again reported that Headquarters 1st ALTF had been handicapped in the past by lack of qualified inspection personnel. Headquarters USAFE again initiated action to secure adequate and qualified air inspection personnel.

COMMAND

Considerable disagreement and misunderstanding existed between the USAFE wing-base organizations and the troop carrier units assigned to 1st ALTF. Many of the administrative and logistical functions normally included as the responsibility of a headquarters having command jurisdiction were still being performed by Headquarters USAFE. This was due to the fact that functions other than those of operations had never been actually delegated to Headquarters 1st ALTF. Channels of command were not generally understood because of the "dual" command established.

It was recommended that consideration be given to assigning command jurisdiction of the wing-base organizations at Wiesbaden and Rhein/Main Air Bases to command jurisdiction of Headquarters 1st ALTF.

The Commanding General, USAFE, agreed with the above recommendation and necessary instructions were issued for its implementation.

MAINTENANCE

Long range plans for full and economic utilization of assigned aircraft were not sufficiently developed. Only minimum maintenance on a day-to-day breakdown basis was being performed. However, this minimum of maintenance being performed (Note chart summarizing aircraft inspected) was reducing the expected life of these aircraft.

The USAFE Air Inspector recommended that maintenance be performed on a controlled long-range policy and that attention be directed toward "preventive maintenance" rather than "breakdown maintenance" when possible.

PHASE-OUT INSPECTIONS

The Annual Air Inspection of Headquarters USAFE was conducted by the Air Inspector, USAF, during the period 25 July - 26 August 1949. It was preceded by Special Inspections of two Airlift bases and the 85th Air Depot Wing, as well as three other USAFE non-Airlift units. A

USAF Special Inspection Report dated 5 August 1949 and covering the 317th Troop Carrier Wing, which was the first Airlift unit to be deactivated and was phasing out at time of inspection, included a Special Annex report, "Phase-Out Observations and Recommendations", which emphasized that "earlier and more complete distribution of pertinent sections of the phase-out plans to interested staff activities and to lower echelons would have permitted smoother initial execution." The USAFE Air Inspector reported on 31 August 1949 that solutions to phase-out problems encountered by this initial unit were utilized to advantage in succeeding phases of the Airlift inactivation. The Air Inspector, USAF, reported:

"'Operation Vittles' which was conducted within this Command, is the most convincing demonstration of air power since the war, and did much to enhance the prestige of the United States and to assist in the attainment of the national objectives. This operation demonstrated the ability of USAF to perform an emergency task of major magnitude in a highly creditable manner." Headquarters USAFE placed emphasis during the inac-

NUMERICAL ANALYSIS OF DISCREPANCIES NOTED DURING INSPECTION OF 48 AIRLIFT AIRCRAFT 15 MARCH - 2 APRIL 1949										
AIRCRAFT STATUS AT TIME OF SURVEY INSPECTION	ENGINE DISCREPANCIES		AIRCRAFT GENERAL DISCREPANCIES		COMMUNICATIONS DISCREPANCIES		RECORD DISCREPANCIES		TOTAL	AV/ACFT
	TOTAL	AV/ACFT	TOTAL	AV/ACFT	TOTAL	AV/ACFT	TOTAL	AV/ACFT		
"INSPECTIONS IN PROGRESS" AIRPLANES INSPECTED - 15	279	19	226	15	136	9	276	18	917	61
"FOLLOWING COMPLETED UNIT INSPECTIONS" AIRPLANES INSPECTED - 13	207	16	177	14	132	10	169	13	685	53
"OUT FOR UNSCHEDULED MAINTENANCE" AIRPLANES INSPECTED - 15	423	28	233	16	151	10	191	13	998	67
"AIRCRAFT RECEIVED FROM BURTONWOOD" AIRPLANES INSPECTED - 4	100	25	53	13	40	10	56	14	249	62
"AIRCRAFT RECEIVED FROM CONTRACTOR 1000 HR" AIRPLANES INSPECTED - 1	17	17	11	11	9	9	25	25	62	62
TOTAL DISCREPANCIES	1026		700		468		717		2911	
AVERAGE DISCREPANCIES		21		15		10		15		61

tivation phase on inspection activities and the responsibilities of all personnel towards completing inactivation responsibilities in an orderly manner. The Vittles Phase-Out Plan issued 18 July 1949 by Headquarters 1st ALTF contained a provision that a special overseas movement inspection would be conducted by that Headquarters of each organization returning to the ZI. A letter, Headquarters USAFE, dated 19 August 1949, subject: "Inspection Jurisdiction of Units Assigned to 1st Airlift Task Force, APO 633, US Air Force", delegated the responsibility for performing phase-out and inactivation inspections of all subordinate units to the 1st ALTF. These inspections, conducted by the 1st ALTF Air Inspector during the period 8 August - 29 September 1949, were only advisory in nature, and the findings were left with the responsible commander for action without requiring an indorsement. Wing-base air inspection personnel at Celle and Fassberg Air Bases participated in production lines established for final clearance of personnel and turn-in of all organizational equipment in the phase-out of those bases. A specialized deactivation team from Erding Air Depot operated a final inspection, complete property acceptance, and disposition production line. This type of phase-out operation assisted immensely in assuring proper and expeditious deactivation in these organizations.

On 30 September 1949 the USAFE Air Inspector conducted the final inactivation inspection of Headquarters 1st ALTF. This report concluded that the 1st ALTF had discharged its responsibilities in the phase-out of its subordinate units in an expeditious and adequate manner and determined that adequate action had been taken or plans were satisfactory for the disposition of personnel, prisoners, property, funds, real estate, contracts, legal matters, and records with the exception of fourteen items of unfinished business. These items were reported directly to Headquarters USAFE for completion as Headquarters 1st ALTF ceased functioning at 2400 that date.

RESULTS

Through the medium of the air inspection system,

commanding officers of Airlift units were informed of conditions affecting the accomplishment of their assigned missions, economy of operation, and managerial efficiency, including the commendable aspects thereof. While the efficiency of such reporting was satisfactory, necessary corrective and follow-up action by unit commanders to prevent recurring deficiencies was hampered by the means available to them and by the shortage of personnel who had the necessary experience and initiative to accept and discharge the responsibilities of the grade and position held. It is believed that the air inspection system was also helpful by bringing irregularities, deficiencies, and commendable practices to the immediate attention of the various individuals primarily concerned, thus serving to assist on-the-job training.

Personal conference periods were scheduled and conducted in conjunction with all Annual and Quarterly Air Inspections. Complaints were also accepted by air inspectors at any time. They reached an all time Airlift high in June 1949 with a total of 83 complaints. Of this number, 19 were justified, 10 unjustified, and 54 were requests for information. Majority of complaints were:

- (1) Uncertainty of duration of temporary duty (TDY) status.
- (2) Shortage of family-type quarters.
- (3) Uncertain delays in arrival of dependents.
- (4) Unwarranted and unfair delays in arrival of personal baggage.

CONCLUSIONS

Air inspection sections authorized under the present Wing-Base T/O&E, are not adequate to accomplish air inspection requirements effectively in an Airlift operation committed to deliver the maximum tonnage possible.

The establishment and build-up of the air inspection system should be proportionate to and concurrent with the augmentation of any other activity rather than months later.

The air inspection system should endeavor to operate in a similar manner to preventive maintenance, rather than as a "Monday morning quarterback," in order that

necessary corrective and helpful action can be initiated early enough to prevent development of serious conditions.

Air inspection should be welcomed as an opportunity to obtain a commendation and regarded in the same light as an inoculation against disease. Such inoculations sting initially but results may prevent a disheartening epidemic.

AIR PROVOST MARSHAL

MISSION

Throughout the Airlift operation, the mission of the Air Provost Marshal Division was supervision and formulation of major policies on all matters pertaining to provost marshal activities and supervision and inspection of all matters pertaining to law and order and the enforcement of internal security. The additional responsibility for the security function of determining the loyalty and character fitness of all AF military and civilian personnel and reporting the results of completed investigations was assumed in December 1948.

ORGANIZATION

The responsibilities of the Air Provost Marshal during the first seven months of the Airlift operation were accomplished through direct contact with wing or base commanders and through liaison with the air provost marshals in the field. In February 1949 an air provost marshal was assigned to the office of the Inspector General, Headquarters 1st ALTF, and supervision of all provost marshal functions within Airlift units was delegated to that office, which functioned until 1 August, at which time the Inspector General absorbed the functions because of early phase-out plans.

Just prior to the beginning of the Airlift the provost marshal function was transferred under the provisions of

AF Letter 20-4 from A-1 (now Deputy Chief of Staff, Personnel) to the Inspector General. At that time the Air Provost Marshal had under its direction two sections. The first of these was the law enforcement section of air police and auxiliary guards; the auxiliary guards were German Guards (Polish nationals) and Industrial Police (German nationals). The second Air Provost Marshal section was the confinement and correction section, with responsibility for supervision of guardhouses and rehabilitation of prisoners. In December 1948 the Air Provost Marshal assumed the responsibilities of security, which up to that time had been under the supervision of the Director of Intelligence. From the beginning of the Airlift to March 1949 the Air Provost Marshal office, Headquarters USAFE, almost doubled in size, due to the increase in the number of serious incidents and the additional workload acquired with the loyalty investigation program.

During the initial phase of the Airlift, the requirements in personnel and transportation at the base level in the American zone were met by air police squadrons and air provost marshals assigned to the Airlift bases. Generally, as the strength of these bases increased, the air police squadrons were increased. Air police guard responsibilities were augmented at Rhein/Main, Wiesbaden, and Tempelhof Air Bases by Polish Guards and Industrial Police, whose duties were confined to internal guard for the protection of government property and personnel.

When the bases at Fassberg and Celle in the British zone were established, the requirements for air police personnel first appeared to be less, due to the presence of allied military police. It was found, however, that American airmen could not be successfully and fully controlled by allied military police, and that the same complement of air police would be required, based on the number of personnel, as was required on bases in the American zone.

The influx of personnel for the operation consisted mainly of pilots, crewmen, and mechanics. Consequently, the procurement of qualified trained air police left much to be desired, and relatively large portions of air police squadrons were untrained basics. Military police schools within the zone were utilized to the fullest extent to bring

these squadrons up to the desired qualifications. Transportation and equipment resources such as jeeps, trucks, sidearms, etc. were obtainable in an adequate amount.

OPERATIONS

LAW ENFORCEMENT

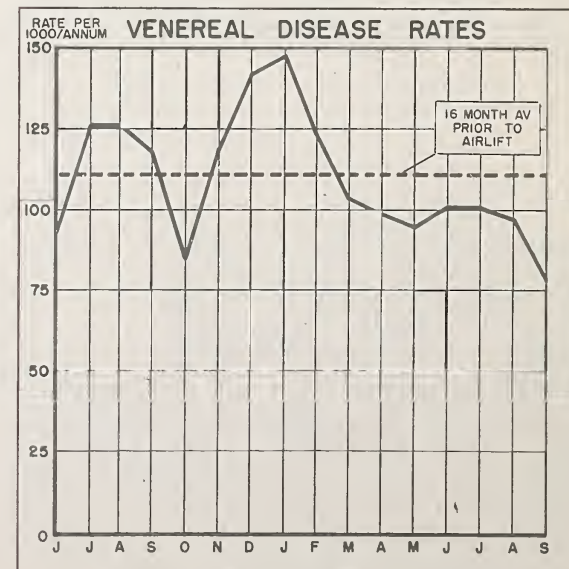
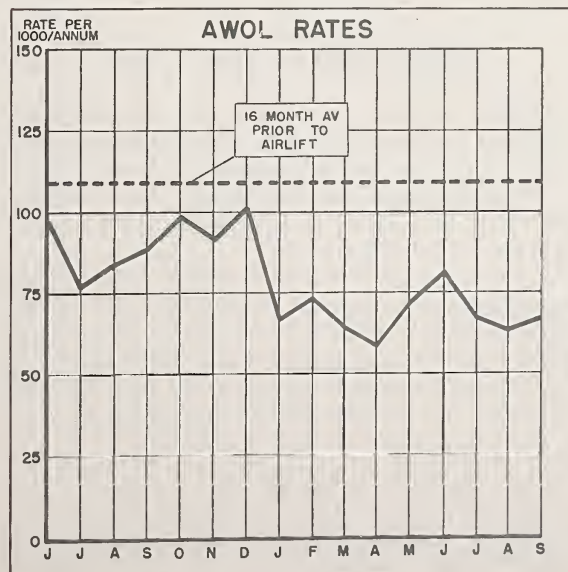
Inasmuch as discipline depends primarily on morale, which is in turn influenced by living and working conditions and recreational facilities, activities pertaining to enforcement constituted a major problem within the Airlift installations. Considering the great influx of TDY personnel, however, most of whom had departed from their permanent stations without adequate preparations for care of their families and personal matters, the rate of major violations could not be considered excessive.

A study of the AWOL rate for USAFE reveals some decrease beginning with July 1948 when the Airlift came into being. This decrease was consistent throughout

the duration of the operation. Many explanations could be advanced for the condition, but the most plausible would appear to be the fact that the personnel generally were well impressed with the mission of the Airlift and were relatively busy as compared to normal peacetime employment in routine training.

The American VD rate at Fassberg and Celle, although high, was not alarmingly so. The British cooperated whole-heartedly in picking up loose German women for necessary medical examination and confinement when required. Steady progress in the control of vice was made as air police became better trained and commanding officers, chaplains, and character guidance councils took a greater interest in the subject. The VD rate declined perceptibly during the last months of the Airlift.

Because of Berlin's isolation, certain necessities, especially cigarettes, candy, coffee, and cooking fats, became very valuable to the German population and were there-



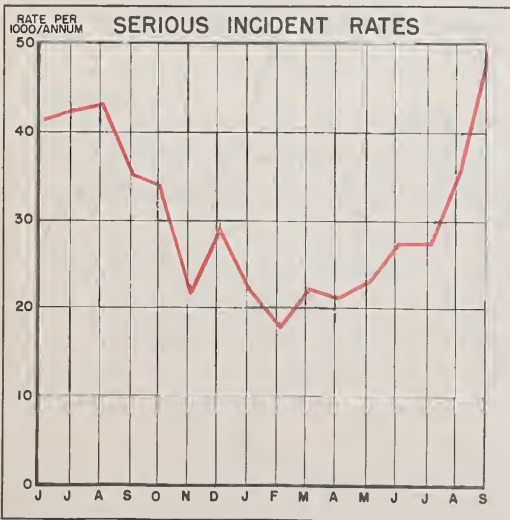
fore considered attractive items for black market or illegal trade. To prevent the use of Airlift aircraft for illegal transport of these items into Berlin, air police were used to search all aircraft baggage and packages transported into Tempelhof, Tegel, and Gatow. Items found in excess of personal needs or in commercial amounts and suspected of being brought in for illegal trade were impounded. This measure had the desired effect of eliminating the use of aircraft for black market activities. Disciplinary action taken against personnel who were reported for violation, while not always of sufficient force to deter others at the beginning, was of such nature that in the latter phase of the operation very few violations were noted.

In January 1949 the serious incident branch was established within the Air Provost Marshal. This section is responsible for receipt and preparation of reports on "serious incidents" and for weekly or daily follow-up depending on the nature of the case. All serious incidents are required to be reported from the field within 48 hours

after the occurrence. They include:

- a. All felonies in which the following type of personnel are known or suspected to be involved or implicated:
 - (1) US military or civilian occupational personnel and/or their dependents.
 - (2) Allied military and civilian personnel who are employed by, serving with, or accredited to the US occupation forces and/or their dependents.
 - (3) Any other person under US military control.
- b. Motor vehicle accidents in which government or privately owned vehicles registered with EUCOM are involved, which result in death, serious injury, hit and run incidents, or property damage in excess of \$100.00.

The serious incident rate declined as did the AWOL rate, as evidenced by the figures in the table below, until September 1949. At that time operations had practically ceased and some personnel again had ample time to get into trouble, in spite of training schedules provided at several bases.



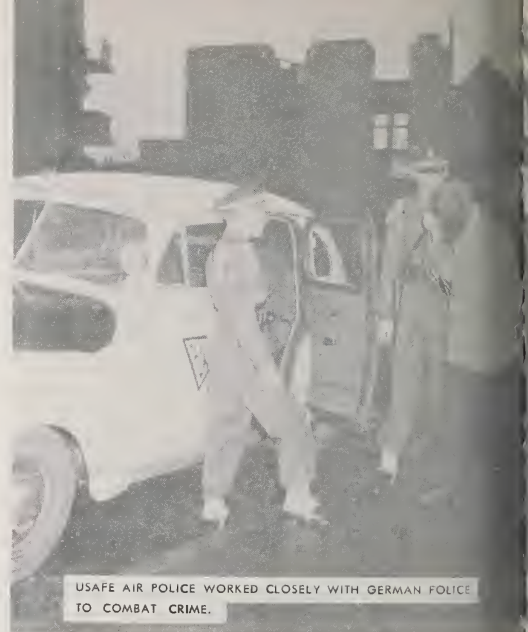
CONFINEMENT AND CORRECTION

Due to the Air Force policy of confining only those who were habitual repeaters or who had committed a more serious crime, the prisoner rate was kept relatively low at Airlift bases. Only those were confined where it would have been prejudicial to the Air Force and to good discipline not to have done so.

A study was made in the spring of 1949 relative to the establishment of a command rehabilitation center for all command garrison prisoners. Due to the low prisoner rate and the short terms of confinement, it was decided that a rehabilitation program designed for the individual base guardhouse would accomplish the same end.

SECURITY

Early in December 1948 the screening of German nationals became the responsibility of the Air Provost



Marshal. At the same time the responsibility for procuring personnel clearances of civilian and military personnel was assumed.

To insure the proper placement of German nationals, screening centers were established throughout the command under the supervision of the Air Provost Marshal. At Celle and Fassberg this screening responsibility rested with the British. Labor Service Companies in the American zone, formed to do the necessary loading and unloading at Airlift bases, were screened by Headquarters EUCOM before being sent to an air base to perform their assigned mission.

As the strength of Airlift bases rose, the need for personnel security clearances increased. From a modest beginning, the need for personnel security investigations increased to an average of 97 per month for the period January through September 1949 with a peak of 150 in the month of May 1949.

**CIVILIAN GUARD
DETACHMENT
ENTER ON OFFICIAL
BUSINESS ONLY
BY ORDER OF C.O.**

THE CIVILIAN GUARDS AND INDUSTRIAL POLICE
CONSTITUTED AN EFFECTIVE SECURITY FORCE AT AIRLIFT
BASES.

AUXILIARY GUARDS

Two types of auxiliary guards, the Civilian Guards (Polish) and the Industrial Police (German) were on hand to supplement air police strength in accomplishing security needs at the U. S. zone Airlift bases. These guards were strengthened and made more effective by the utilization of guard dogs in perimeter and storage areas.

Both types of auxiliary guards were furnished with guard dogs which were purchased from, and very excellently trained by, EUCOM Quartermaster Dog School at Darmstadt. It has been found that for certain types of duty, one man with a properly trained dog is more effective than two, or even three, men without dogs. The effective range of a perimeter guard post may in some cases be extended two or three times by addition of a guard dog. Of a total USAF guard dog strength of 175 dogs, approximately 50 were used for Airlift security.

CONCLUSIONS

If a commander is to be kept informed on the state of discipline of his command, a sufficient air provost marshal reporting system must be completely installed as expeditiously as possible. As increasing administrative responsibilities were assumed by the Air Provost Marshal, his facilities in personnel and equipment should have been increased in order to keep the Commanding General fully informed at all times. Loyalty checks of any value were difficult to make because of these shortages. With his limited facilities, the greatest value of the Air Provost Marshal to the command was his frequent field visits and inspection-instructions.

As revealed by USAF inspection reports and substantiated by field visits and special inspections, the quality of air police was considerably below the standard set by Hq. USAF. Careful screening to weed out the undesirables should have been accomplished prior to assignment to AF squadrons. None the less, this screening had to be done constantly with few replacements available.

The quality of air provost marshals and air police officers, on the other hand, was high; without such quality a grave disciplinary problem would have resulted.

Base commanders generally accepted the principles of the new concept — that is, the inspection and reporting functions of the wing air provost marshal. Because of the shortage in the beginning, air provost marshals sometimes wore two hats, acting both as wing air provost marshals and as air police squadron commanders. This dual function was eliminated as rapidly as additional air police officers became available.

The value of the Polish Guards and Industrial Police cannot be too heavily stressed. Without these personnel for added guard duties, the pilferage rate would have been so high as to make the entire Airlift effort almost too costly to continue.

In spite of a shortage of air provost marshals and air police officers, the Military Personnel Branch at the base level, with the approval of the base commander in several instances, assigned officers in the primary MOS of 9100 to entirely different tasks. Such malassignments were not

infrequent; to prevent them, the interested staff officer should be consulted by military personnel for recommendations as to assignments of officers qualified in such a critical specialty.

The lack of regard by many officers and airmen in illegally using Airlift aircraft for black market purposes was particularly discouraging, and only the most drastic measures ultimately cured the situation.

RECOMMENDATIONS

The necessity for the immediate assignment of an Air Provost Marshal with sufficient staff to keep the commander of a task force informed of the state of discipline of his command is paramount. On an equally important basis is the necessity for immediate airlight security.

The highest type of trained air police is required in an extensive special operation. No time is available to train such raw recruits as were often assigned to air police squadrons. The procurement of specialists in the air police field deserves as careful planning as does the procurement of personnel in maintenance, supply, and administrative specialties.

The wing-base responsibility for discipline should be impressed on all officers at each command level down through that of the squadron.



GUARD DOGS TRIPLED THE EFFECTIVENESS OF AUXILIARY GUARDS.

OFFICE OF SPECIAL INVESTIGATIONS

The Office of Special Investigations is an agency of the Inspector General, USAFE, charged with the duty of preventing, suppressing, and investigating major crimes, other violations of public trust, prejudices to good military order, and subversive and related activities; in addition, it is charged with the exploitation of positive intelligence sources within the jurisdiction of USAFE.

ORGANIZATION

During the period of the Airlift's operation the Office of Special Investigations, USAFE, as such, barely came into being. Its investigative activities were carried on,

SUMMARY OF MAJOR CRIMES INVESTIGATED												
TYPE OF CRIME	J	J	A	S	O	N	D	J	F	M	A	M
HOMICIDE		4	3	6	1	4	4	4	6	3	6	6
SUICIDE					1				1	1	1	1
SEX OFFENSES			1						2	4	6	1
ASSAULTS				2		1	1			1	5	8
LARCENY	3	7	4	6	2	4	5	3	8	5	8	3
ROBBERY				2	1	4	1			1	1	1
BURGLARY & UNLAWFUL ENTRY	2	5	2	2	1		1		3	3	6	2
SUB TOTAL VIOLENCE	5	16	10	16	7	8	15	9	16	11	20	16
FRAUD (COUNTERFEIT)		1	1	1	1	1	1		29	24	14	17
IMPERSONATION										1		
NARCOTICS			1	1			2				1	
BLACK MARKET		2			1				1			1
COUNTERFEIT		3	3	4	16	1	1	8				
SMUGGLING				2		1	1	7	8			
OTHERS	3	3	4	1	3	6		28	2	25	23	15
TOTAL	5	20	19	25	17	28	30	25	76	55	55	68

however, by its predecessors, the Army's 31st Military Police Criminal Investigation Detachment (later the Air Force Criminal Investigation Detachment) and the 7020th Air Force Counter Intelligence Unit. On 1 July 1949 these organizations were brought together under one staff agency and on 1 September were redesignated as the Office of Special Investigations, USAFE.

Security restrictions prohibit the setting forth of the actual requirements for an organization of this type. It may be said, however, that there was not a sufficient allotment of trained personnel at any period of the Airlift to do a completely effective job, nor could necessary normal and special items of equipment be provided to aid the teams in the field. There was a serious lack of transportation for investigative activities, and though a complete crime laboratory was needed for CID work, only one item of technical equipment was available and the rest had to be furnished on a personal ownership basis. The lack of personnel and equipment for this non-T/O organization continued to hamper the efforts of the organization throughout the Airlift.

COUNTER INTELLIGENCE UNIT

Very little may be said of the actual activities of the Counter Intelligence Unit but a general outline of its duties may be given. It was charged with the security of all of the air bases. Its mission included the conducting of security checks of personnel and of administrative security procedures. It acted in an advisory capacity to the unit commanders on matters of unit security. It investigated cases of subversion, sabotage, disaffection, and related acts.

The increase in USAFE personnel necessary to meet the demands of Airlift operations resulted in a marked increase in major crimes. This upsurge was disproportionate to the increase in personnel as indicated by the accompanying chart. Whereas crime incidents were doubled, personnel increased only 50 per cent.

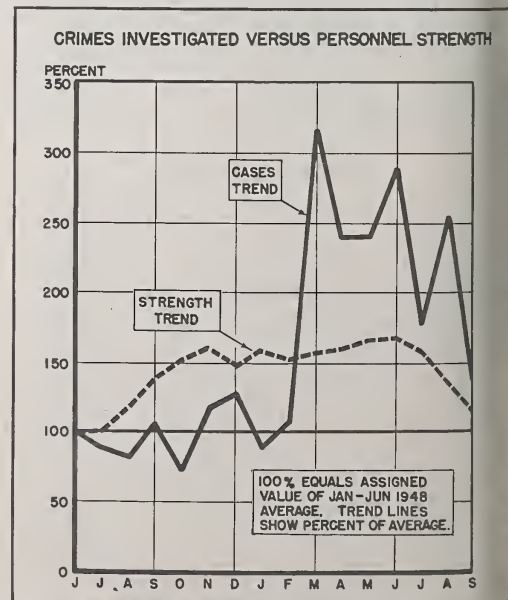
RECOMMENDATIONS

The conclusions to be drawn from a study of case histories of criminal incidents attributable to the Airlift leads to the following recommendations:

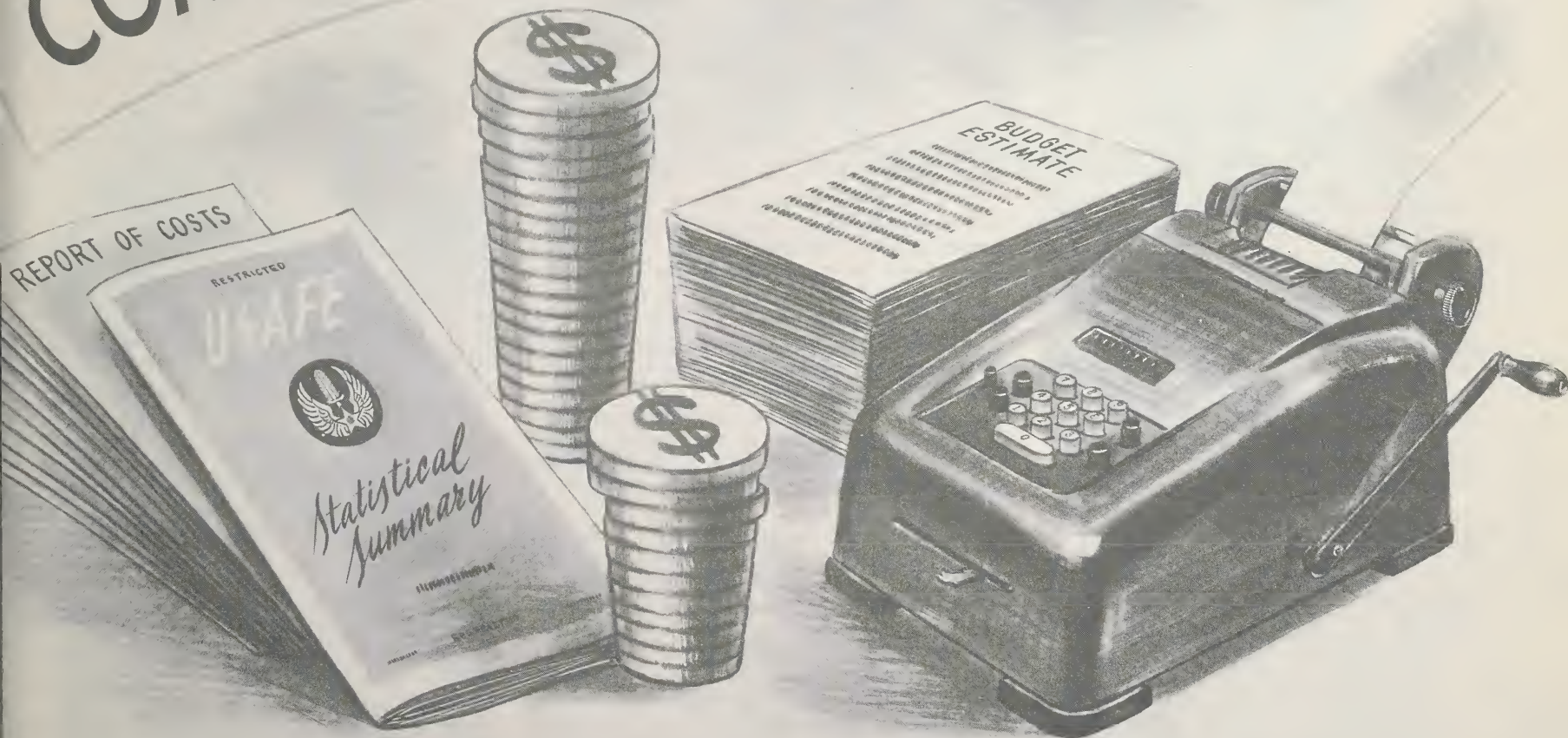
The requisitioning of OSI personnel for an expanded operation should be considered an integral part of expansion plans. A comparable increase in pertinent equipment and in confidential funds should be similarly included.


All personnel should be indoctrinated by unit commanders in the importance of security in connection with the special operation.

All indigenous civilian personnel who are to be used in a special operation should be properly screened before employment.



COMPTROLLER





The Comptroller System established in Headquarters USAFE was assigned the responsibility for assembling, evaluating, and presenting to the commanders the essential elements of information necessary for effective control and management of Airlift operations. These responsibilities were partially delegated to Comptroller agencies at Headquarters 1st ALTF and to each Airlift base. This system performed the technical functions of reporting, budgeting, disbursing, and costing.

The Airlift afforded probably the first real opportunity to observe the performance of the recently established USAF Comptroller System under an emergency situation of extended duration. The experience gained thereby is presented in this chapter.

The accountability for supplies and funds for Airlift activities is a special subject more fully covered in other chapters. From the Comptroller viewpoint several instances of laxity and negligence were revealed. This was particularly true in connection with the clean-up activities near the end of phase-out operations involving terminal audits of military property accounts and final audits of non-appropriated funds. Recognizing the emergency nature of the initial establishment of Airlift bases, particularly in the British zone, a much tighter control of supply accounting and administration of non-appropriated funds must be anticipated and provided in the future.

BUDGET AND FISCAL ACTIVITY

Preparation and support of budgetary estimates and central control of funding operations for the Airlift organizations of USAFE were the responsibility of the Budget and Fiscal Directorate, DCS/Comptroller, Headquarters USAFE, during the entire life of the "Vittles" project. This staff agency was also responsible for insuring the audit of non-appropriated funds of the Airlift organizations.

FUNDING STRUCTURE

To appreciate the fiscal responsibilities and functions of USAFE organizations in support of the Airlift, it is necessary to understand the general funding structure whereby the command is provided with resources to sustain its operation. The life blood of the financial structure consists of Dollars from the U. S. economy and Deutsche Marks from occupied Germany.

The first and principal source of support for operation of USAFE is, of course, the American taxpayer, who, through Congress, authorizes appropriations of funds to maintain the Air Force.

Budgetary and fiscal control responsibilities for the major portion of the appropriated funds used to finance such items as military personnel, aircraft, vehicles, petroleum products, uniforms, etc., are handled through central administering and procurement agencies and not allocated to the operating units.

Other items charged to the dollar appropriations which can be more economically financed from funds at the disposal of the local commanders, such as U. S. civilian personnel, temporary duty travel, and minor items of supply, are funded from amounts allotted through echelons of command to the local field organizations. It is this type of item for which the command has funding responsibilities.

The other source of support for the occupation forces in Europe is derived from assessment of the German economy. Such support, usually referred to as the Deutsche Mark Budget, includes all items obtainable from Germany necessary to support the occupation. The German support

budget is sub-divided into two principal categories — the Occupation Cost Budget and the Non-Occupation Cost Budget. Occupation Cost Deutsche Mark funds are derived from the German economy and provide for normal U. S. military occupation costs in Germany. Non-Occupation Cost Deutsche Mark funds are also provided by the German economy; however, they are expended for the direct benefit of the German nation. Practically all items financed by the German economy for direct support of the Airlift, including construction, personnel, and supply items, were charged to non-occupation funds.

The total cost of USAFE participation in operation "Vittles" is presented in the section on Cost Control and Analysis. Of the total cost of this operation, approximately 47 million Deutsche Marks and 330 thousand dollars was obligated against funds made available in an allotted status to Headquarters USAFE.

From a fiscal standpoint, the Airlift closely approximated a wartime operation, inasmuch as its success transcended practically all budgetary considerations. While budgetary estimates were carefully prepared, activities in support of the Airlift mission were not necessarily limited to manpower ceilings and budget programs. This condition was, of course, much more prevalent during the earlier period of the Airlift than in the later phases when requirements began to stabilize and standards were developed.



ORGANIZATION

From the beginning of the Airlift operation, only relatively minor difficulties were experienced in discharging budget and fiscal responsibilities, from a trained personnel standpoint, as three of the major terminus bases, i. e., Rhein/Main, Wiesbaden, and Tempelhof, were staffed with experienced budget and fiscal organizations. A small budget and fiscal office was established at Headquarters 1st ALTF to serve in a liaison and advisory capacity only, as funds were not allotted through that headquarters to the operating units in the field. Close coordination was maintained with Headquarters 1st ALTF, but the actual funding channels were directly between Headquarters USAFE and the various participating bases. The 1st ALTF exercised full jurisdiction over only the operational elements at such bases.

The participating installations in the British zone of occupied Germany, Celle and Fassberg, were funded under an agreement with the British whereby the United Kingdom assumed full financial responsibility for all Airlift cost in the British zone chargeable to Deutsche Marks derived from the German nation. Conversely, the United States assumed responsibility for Airlift expenses incurred at American zone installations chargeable to the Deutsche Mark budget program. This simplified funding agreement proved very effective and avoided many complications which would likely have arisen under other possible arrangements. Several areas, however, were not clarified in the initial agreement from a budget and fiscal standpoint, due primarily to the fact that budget and fiscal technicians did not participate in drafting the original agreement.

AUDIT OF NON-APPROPRIATED FUNDS

Due largely to the rapid establishment of clubs and messes occasioned by the great influx of U. S. personnel at Celle and Fassberg, a few special problems developed regarding the proper supervision and control of non-appropriated funds. A survey indicated that many of the

club and mess funds were in chaotic condition and that, in some instances, no records of monetary transactions were being maintained. This situation was attributed largely to the inexperience of the custodians, who were usually newly-assigned personnel charged with a number of other duties. Careful monitoring of the funds, however, resulted in correction of minor irregularities, and quarterly audits showed continued improvement in their operation.

In March 1949, a gradual increase was evident in the net worth of many of the club and mess funds, partially caused by the fact that German labor costs were borne by the British DM appropriated funds. The auditors from USAFE suggested to the custodians that reductions in net worth should be made so that members might benefit from the favorable financial condition. Until August 1949, however, when Celle and Fassberg RAF stations were alerted for close-out, a majority of the club and mess funds still showed large net worths. From this close-out date, maintenance of records deteriorated as a result of rapid changes in personnel, and funds were in some instances spent so rapidly as to constitute unlawful dissipation of monies.

CONCLUSIONS

Continuing careful analysis should be made of obligations incurred at installations participating in or supporting operational projects of great magnitude to determine the amounts attributable to the direct and indirect support of such special operations. This is essential in order to prepare adequate budgetary estimates, evaluate performance, and prepare interim and post operational reports.

Funding agreements between nations and other governmental departments, where applicable, should be reached prior to or as soon as possible after commencement of special operations such as the Berlin Airlift. Such agreements should clearly indicate financial responsibilities within various funding areas.

Administration and control of funding operations should be restricted to previously established channels

wherever possible and not delegated to temporary task force organizations.

Extreme care should be given during the initial phase of a special operation to insure that policies and procedures controlling non-appropriated fund administration, as well as personnel assigned, are adequate to cope with a rapid growth of such activities due to a large influx of personnel.

FINANCE DISBURSING ACTIVITIES

During the period of the Berlin Airlift, the finance activities of the Comptroller were carried on in Headquarters USAFE by the Directorate of Finance. Specific functions for which the Directorate was held responsible included payment of all USAFE personnel, and review of and recommendations on matters pertaining to loss of funds, and loss, damage, or destruction of public property.

PAYMENT OF PERSONNEL

Payment of Airlift personnel was made through numbered finance disbursing units. Each of these units serviced a specific area, and they were made operative as the Airlift expanded. Continuous influx of personnel necessitated that these units operate at peak load capacity, and in some instances the work load exceeded 300 percent of previous norms.

It was necessary to operate under the increased workload with only slight increases in personnel, and in June 1949 it was further necessary to discontinue the 317th Unit as an Accountable Disbursing Office because of the shortage of disbursing officers. In spite of these difficulties, payment of personnel was effected on time and in accordance with prescribed regulations and directives.

PER DIEM

One of the primary and most demoralizing problems arose from the inconsistency of travel orders under which personnel from other commands were placed on temporary duty with the Airlift. Although duties of the personnel from

a finance standpoint were identical, some personnel were authorized per diem and others were not. Some commands, including MATS, had issued instructions for operational units to charge per diem to open allotments; other commands had directed the charge to their respective restricted allotments; and still other commands had issued instructions that no per diem be paid. The EUCOM policy prohibited authorization of per diem for personnel traveling on TDY within the European Command who were assigned to any base in the command.

Pursuant to a request of the Commanding General, USAFE, Headquarters USAF on 2 September 1948 advised all Air Force commands to amend existing orders so as to discontinue per diem allowance for all personnel connected with Operation Vittles and eliminate the discrimination. This action established a consistent Air Force-wide policy.

REPORTS OF SURVEY

During the first four months of Airlift operations emphasis was placed on the utilization of reports of survey in the adjustment of military property accounts because field follow-up disclosed that insufficient use was being made of these documents. Further review of reports



PAYMENT OF PERSONNEL WAS EFFECTED PROPERLY AND ON TIME.

of survey from all Airlift stations indicated that there was either a lack of technically qualified supply personnel, or that supply accounting was not being rigidly maintained.

CONCLUSIONS

Finance activities require specialized training, and many difficulties arise when operations are attempted with only inexperienced personnel available. Experience during the Airlift has shown that flexibilities must be introduced into the finance organizations which will permit service to troop units even when personnel assignments are changing rapidly.

Air Force personnel under orders to participate in an activity paralleling combat conditions, field exercises, or maneuvers should be authorized per diem only to and from the location of such activity, wherever it may occur

COST CONTROL & ANALYSIS

Particular interest and concern was shown by Headquarters USAF regarding the cost of the Airlift operation, primarily in view of its budgetary implications. In order to meet this requirement the USAF Cost Control System was immediately expanded and applied to the Airlift activities.

DEVELOPMENT

Plans had just been completed for the initiation of the USAF Cost Control System in USAFE on 1 July 1948. Four days after the inception of the Airlift a survey was made to implement cost reporting, to cover the additional special requirements peculiar to Airlift activities.

Among the problems encountered was the lack of experienced cost personnel and training information - no cost reporting manuals were available. Required personnel were drawn from all available sources, mainly from Statistical Services, but also from surplus navigators. Necessary

AF cost reporting forms were reproduced and personnel and equipment were assembled with minimum delay. The adaptability of the USAF Cost Control System was indicated by the fact that beginning 15 July 1948, actual cost data from Airlift operations were abstracted and reported to Headquarters USAF every ten days. The requirement for these frequent reports was established by Headquarters USAF during the early phase of the Airlift, when the interest was at a high pitch, to keep the top staff currently informed of cost developments.

OPERATION

The requirement for 10-day cost reporting was discontinued 31 October 1948. Thereafter and until the phase-out, Airlift cost data were submitted with the regular monthly cost control reports. Bases which were devoting all their efforts to the Airlift submitted only the regular cost reports; however, bases which devoted only a part of their efforts to the Airlift submitted separate data for Airlift and non-Airlift activity, with costs computed on a proportionate basis.

To insure uniformity and accuracy of cost data, a system of field auditing was established with immediate beneficial results. During the early part of 1949 officers and airmen trained in the special courses on cost reporting at Lowry Field began to arrive and were assimilated into the cost system.

ANALYSIS

The cost data assembled and graphically portrayed on the adjoining charts represents the Airlift costs of USAFE and does not include the Airlift costs incurred by other USAF Commands and activities.

The initial emphasis in cost analysis was placed on breakdowns of base costs by function. Later, month-to-month costs per ton, per plane-mile, and per ton-mile were compiled and graphed with total monthly and accumulated tonnage and costs, to reflect trends in comparative cost and production.

As the daily tonnage increased and the Airlift settled into a semi-permanent organization, a method was established to stimulate productivity and to measure efficiency. In order that unit commanders could scrutinize cost factors in comparison with Airlift groups, total cost factors were segregated into the following three operational classifications:

Direct Flying Costs. Group operational costs which rise and fall in direct proportion to tonnage airlifted — on a comparable basis to the Air Transport Association's "Civilian Airlift Breakdown."

Indirect Base Costs. Overhead service costs which are relatively stable, regardless of the day-to-day fluctuations in tonnage hauled.

Support Costs. Services rendered by off-the-base installations (excluding Zone of Interior) over which the group commander exercises no control from a cost standpoint.

A monthly recapitulation of these cost breakdowns showing cost per ton and per ton-mile by group was inaugurated early in 1949, and the information was thereafter furnished to group commanders with appropriate remarks for further analysis and necessary action.

CONCLUSIONS

One of the outstanding results of the establishment of cost reporting for Project "Vittles" has been the accumulation of total cost data of the entire operation. Statistics gathered and tabulated will be of invaluable aid in budgeting for such an operation. However, a greater degree of efficiency and savings might have been realized had there been adequate personnel for further analysis of functional cost and aggressive application of such evaluations.

The standardized cost reporting system permitted a fair comparison of the information obtained therefrom and resulted in better control of Airlift expenditures. It may be concluded that while there were slight deviations from standard cost procedures during the first few months, such discrepancies were shortly rectified. Statistics accumulated indicate a satisfactory accounting of project costs.

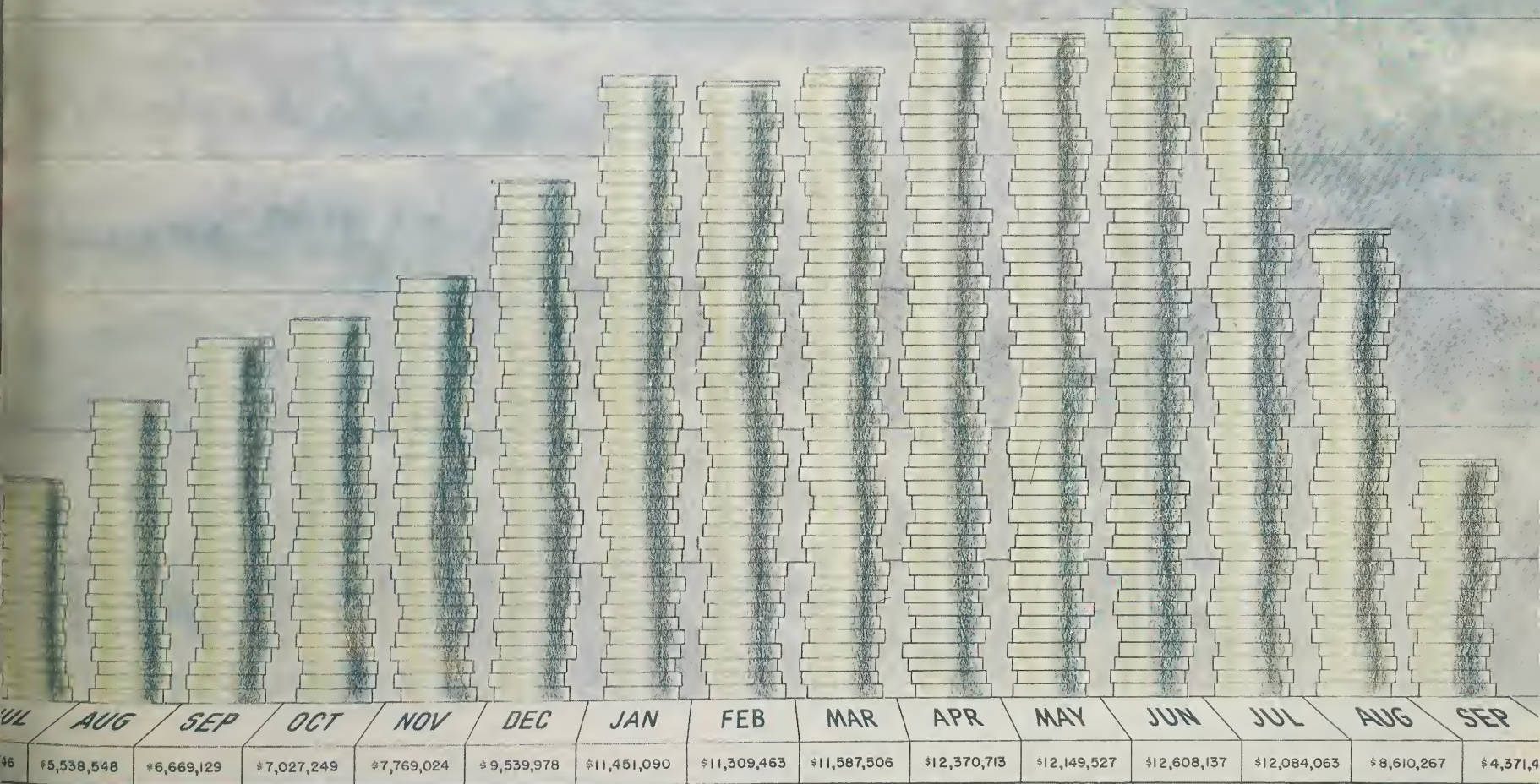
USAFE COST OF BERLIN AIRLIFT



*COST OF AIRLIFT WOULD BUILD
2 UNITED NATIONS BUILDINGS*

COST OF AIRLIFT
\$ 137,177,427

Monthly Cost of the Airlift



CONSOLIDATED AIRLIFT DOLLAR COSTS

COST DESCRIPTION	COST CODE #	TOTAL COST	HQ 1st ALTF	WIESBADEN	TEMPELHOF	RHEIN/MAIN	FASSBERG	CELLE	ERDING	OBERPFAFFEN-HOFEN	BURTONWOOD
COMMANDER & STAFF	01051	1 459 463	289 521	86 100	125 713	451 708	229 261	167 186	83 421	—	26 553
ADMIN. & SERVICES O.H.	02061	1 093 703	118 861	121 830	38 717	277 687	159 980	170 676	174 791	—	31 161
MOTOR POOL	02136	1 624 482	—	134 240	82 393	630 032	338 701	161 126	208 459	18 373	51 158
BASE OPERATIONS	02142	1 072 685	4 942	139 145	251 450	503 291	93 316	34 038	20 556	4 022	21 925
WEATHER SERVICES	02144	579 848	—	170 990	121 962	224 631	14 516	30 612	10 560	—	6 577
AACS & CONTROL TOWER	02146	2 490 270	—	392 154	538 741	1 159 523	229 596	103 236	19 740	—	47 280
TRAFFIC	02148	510 277	2 336	109 550	65 233	214 778	77 176	33 561	4 684	—	2 959
MISC. SERVICES	02150	3 343 674	77 232	220 047	228 471	1 225 546	540 010	477 119	434 985	463	139 801
INSTALLATIONS	02261	1 502 801	484	137 565	387 748	615 212	74 908	82 732	128 231	26 697	49 224
MAINT.—AUTO & EQUIP.	02302	709 061	—	54 206	64 723	287 982	133 325	67 553	70 543	18 835	11 894
MAINT.—ADMIN. AIRCRAFT	02306	248 391	—	70 766	3 451	13 706	65 425	32 957	58 340	—	3 746
MEDICAL	03277	501 178	1 102	44 069	36 720	180 644	78 222	80 822	53 179	—	26 420
UNDISTRIBUTED CHARGES	04151	8 354 734	170 950	805 577	425 293	3161 329	1 585 534	1 162 219	677 636	113 844	2 52 352
MAINT. & SUPPLY O.H.	05050	507 375	35 507	56 209	13 598	126 531	86 357	102 828	34 976	3 338	48 031
MAINT.—AIRCRAFT	05102	2 458 227	—	178 298	25 250	1 293 360	218 165	267 530	—	475 624	—
MAINT. OTHER	05104	462 116	10 180	143 924	134 675	158 380	—	4 334	6 416	4 207	—
OTHER MAINTENANCE	05260	380 663	12 443	71 849	39 681	149 379	50 574	40 743	2 791	10 679	2 524
SUPPLY COST	05450	1 536 599	84 215	107 515	74 678	588 188	298 717	246 577	112 399	12 114	12 196
OPERATIONS & TRAINING	07061	2 294 304	219 539	325 708	1 334	1086 896	333 861	319 431	—	7 535	—
FLYING PERSONNEL	07102	36 156 896	—	5 760 992	88 866	18 256 755	7 964 407	4 018 728	—	67 148	—
MAINT. (1st & 2nd ECHELON)	07110	7 084 429	—	1 373 516	76 130	3 458 971	1 687 051	464 386	—	24 375	—
OTHER OPER. & TNG. COST	07150	597 793	22 864	17 880	17 483	369 203	16 407	153 956	—	—	—
DEPOT MAINT. & SUPPLY	07770	2 831 130	—	—	—	244	—	—	1 782 116	449 471	599 299
CONSTRUCTIONS	12126	1 301 837	—	261 543	214 420	777 669	25 432	—	19 367	3 406	—
OTHER ADDITIONAL CHARGES	12150	1 809 780	2 830	213 342	93 901	1 188 140	82 590	76 908	133 844	4 804	13 421
<i>SUB-TOTAL COST REPORT</i>	<i>15196</i>	<i>80 911 716</i>	<i>1 053 006</i>	<i>10 997 015</i>	<i>3 150 631</i>	<i>36 399 785</i>	<i>14 383 531</i>	<i>8 299 258</i>	<i>4 037 034</i>	<i>1 244 935</i>	<i>1 346 521</i>
DEPRECIATION		20 544 422	6 536 324	1 844 357	—	7 180 544	2 646 559	2 314 538	—	22 100	—
29% USAF COST O.H.		1 447 169	1 447 169	—	—	—	—	—	—	—	—
<i>SUB-TOTAL USAF COSTS</i>		<i>102 903 307</i>	<i>9 036 499</i>	<i>12 841,372</i>	<i>3 150 631</i>	<i>43 580 329</i>	<i>17 030 090</i>	<i>10 613 796</i>	<i>4 037 034</i>	<i>1 267 035</i>	<i>* 1 346 521</i>
TRANSP. CORPS SUPPORT		5 121 908	78 400	824 762	2 072 201	2 146 545	—	—	—	—	—
BURTONWOOD NON USAF		8 664 302	—	—	—	—	—	—	—	—	**8 664 302
GRAND TOTAL		116 689 517	9 114 899	13 666 134	5 222 832	45 726 874	17 030 090	10 613 796	4 037 034	1 267 035	10 010 823

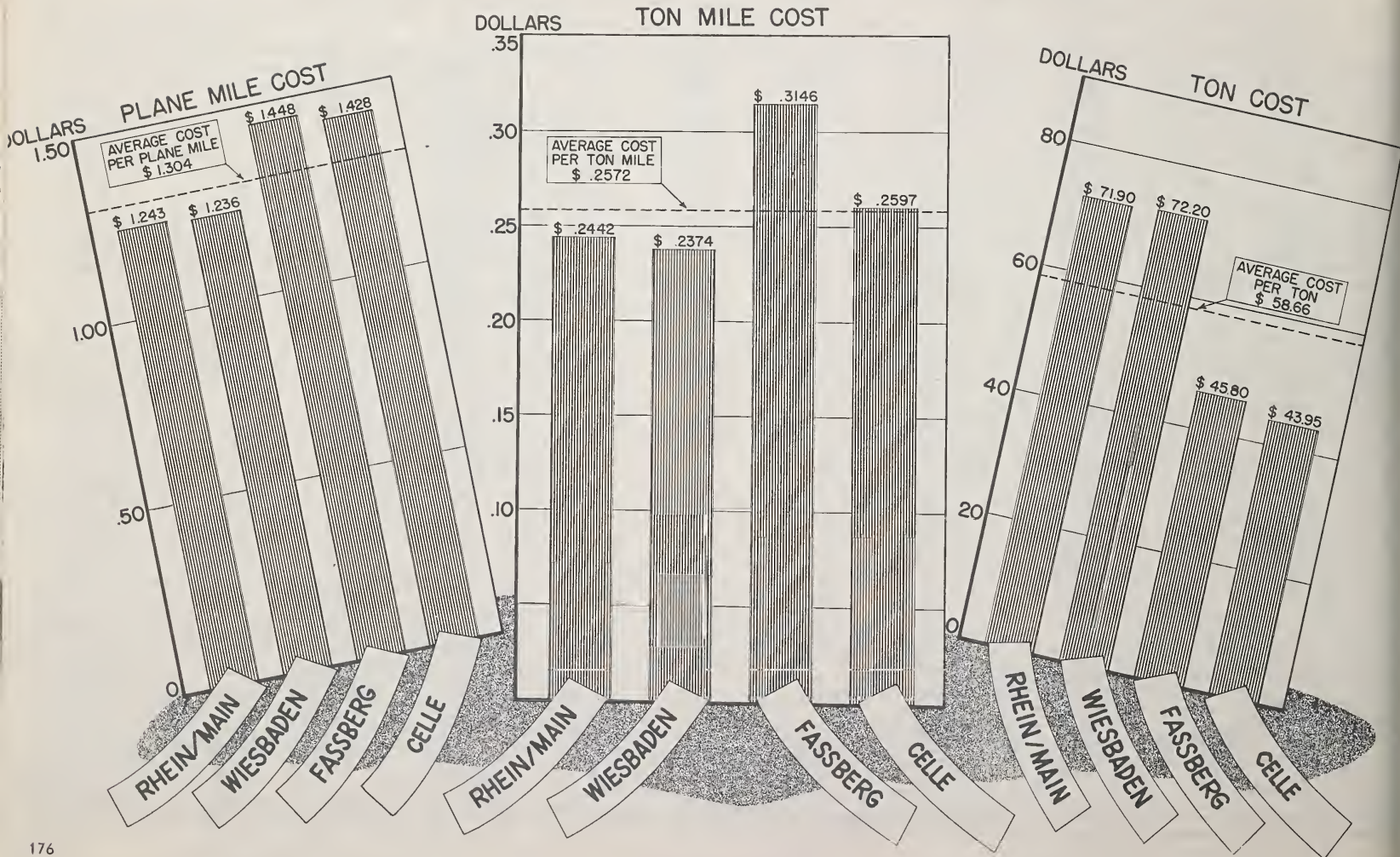
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** 1 JAN - 30 SEP 49

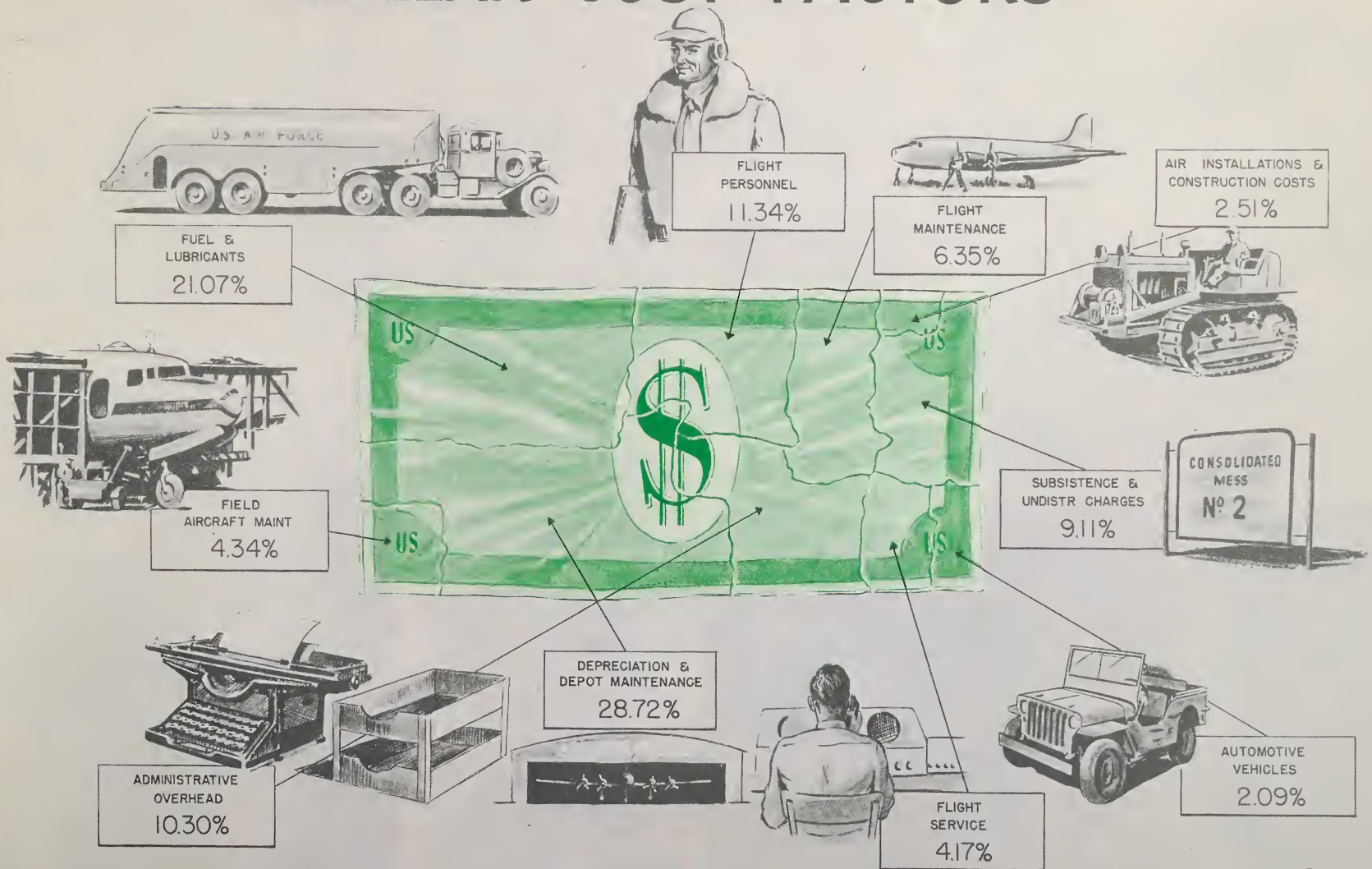
CONSOLIDATED AIRLIFT DEUTSCHE MARK COSTS

COST DESCRIPTION	COST CODE #	TOTAL COST	HQ 1st ALTF	WIESBADEN	TEMPELHOF	RHEIN / MAIN	ERDING	CELLE	OBERPFAFFEN-HOFEN
COMMANDER & STAFF	01051	133 446	38 047	10 390	43 511	27 095	14 403	—	—
ADMIN. & SV. OVERHEAD	02061	42 025	8 752	3 658	—	17 073	12 542	—	—
COMMUNICATIONS	02106	21 046	—	3 060	2 458	14 395	1 133	—	—
PROVOST MARSHAL	02108	133 084	—	1 415	21 630	100 209	9 830	—	—
FOOD SERVICE	02110	176 686	—	61 421	32 139	60 413	7 823	—	14 890
STATISTICAL SERVICES	02116	216	—	—	—	216	—	—	—
PERSONNEL SERVICES	02124	1 320	—	—	—	1 320	—	—	—
MOTOR POOL	02136	172 211	—	47 621	11 948	89 345	6 020	—	17 277
MISC. ADMIN. & SERVICES	02139	128 444	228	7 719	29 114	87 055	4 328	—	—
BASE OPERATIONS	02142	99 281	—	7 856	40 671	50 754	—	—	—
WEATHER SERVICE	02144	57 284	—	280	54 628	2 376	—	—	—
AACS & CONTROL TOWER (ATC)	02146	126 489	—	—	91 684	34 428	377	—	—
BUILDINGS & OTHER STRUCTURES	02206	59 045	—	—	—	5 983	—	—	53 062
AIRFIELD PAVEMENT	02214	744 530	—	15 208	650 534	78 788	—	—	—
UTILITY SYSTEM	02216	44 559	—	41 859	—	2 700	—	—	—
FIRE PROTECT. & ACFT RESCUE	02218	52 375	—	20 818	28 857	2 700	—	—	—
MISCELLANEOUS SERVICES	02220	16 940	—	—	—	16 940	—	—	—
SERVICE GROUP HOUSING	02248	14 982	—	14 982	—	—	—	—	—
AIR INSTALLATIONS	02261	778 217	—	100 524	160 742	514 910	2 041	—	—
MAINT.-AUTO & G.P. EQUIP.	02302	142 116	—	23 914	10 007	87 617	629	—	19 949
ADMIN. & SERVICES	02477	21 776 084	5 525	1610 163	4637 621	12 434 737	3 088 038	—	—
MEDICAL	03277	101 396	—	10 707	8 872	55 975	25 842	—	—
UNDISTRIBUTED CHARGES	04151	1 980 467	—	12 553	243 948	1 422 464	108 258	190 094	3 150
MAINT.-ACFT(C-47)	05102	186 115	—	914	—	21 095	—	—	164 106
MAINT.-ACFT(C-54)	05104	44 984	—	—	—	9 288	—	—	35 696
AIRCRAFT SHOP MAINTENANCE	05160	163 094	—	2 421	18 623	15 559	216	—	126 275
MAINTENANCE CONTROL	05202	5 247	—	—	—	648	—	—	4 599
OTHER MAINTENANCE	05260	22 353	843	1 200	9 245	5 552	—	—	5 513
SUPPLY CONTROL	05402	20 745	—	3 439	—	14 594	—	—	2 712
SUPPLY WAREHOUSES	05404	4 081	—	—	—	3 751	—	—	330
SUPPLY COSTS	05450	77 580	—	8 153	19 251	46 980	1 709	—	1 487
MAINTENANCE & SUPPLY	05581	1 918 907	11 691	102 174	481 265	1 190 265	133 512	—	—
ACFT MAINT.-(1st & 2nd ECHEL.)	07110	100 753	—	4 574	96 179	—	—	—	—
OPERATIONS & TRAINING	07270	980 432	21 093	283 096	11 214	665 029	—	—	—
DEPOT MAINTENANCE	07402	158 510	—	—	—	—	126 673	—	31 837
DEPOT MAINT. & SUPPLY	07770	3 334 548	2 335	—	3 206	—	3,329 007	—	—
CONSTRUCTION COSTS	12126	7 120 644	—	2 488 199	404 744	4 179 671	3 130	5 200	39 700
OTHER ADDITIONAL CHARGES	12150	26 632	—	—	1 994	23 982	656	—	—
29% USAFE OVERHEAD	—	79 629	79 629	—	—	—	—	—	—
GRAND TOTAL	15196	41 046 497	168 143	4 888 318	7 114 085	21 283 907	6 876 167	195 294	520 583
TRANSP. (EUCOM COST)	—	11 855 142	—	740 575	8 226 379	2 888 188	—	—	—
TRANSP. (JEIA COST)	—	15 391 395	—	3 316 700	—	12 074 695	—	—	—
TOTAL "VITTLES" COST	—	68 293 034	168 143	8 945 593	15 340 464	36 246 790	6 876 167	195 294	520 583

AVERAGE AIRLIFT COSTS BY BASE



DOLLAR COST FACTORS



DEVELOPMENT

At every level, however, statistical services rendered other staff assistance. It functioned as a screening agency, acting where appropriate to eliminate duplicate reporting and continuously encouraging the use of information already available in the headquarters of the using agency, so as to minimize unnecessary preparation of reports by lower echelons. It maintained information as to source of statistical data, and it provided the facilities and the technical knowledge for graphic presentation of information suited to such media.

As the operation expanded, the new wings and groups which had arrived from other commands established small statistical offices of their own. Emphasis in these offices was placed almost exclusively on the collection and maintenance of information related directly to the transport operations. Since the newly established bulk allotment wings were station housekeepers only, with no jurisdiction over the groups on the base, the previously well integrated statistical services activities became decentralized, with no one statistical services office in control. Because of the TDY status of many elements, the base statistical office was often bypassed completely; accountability for personnel and aircraft remained with their

Expansion of activities created a shortage of personnel trained in the reporting field. To minimize the supervision problems, surplus navigators, whose training in mathematics had conditioned them for such work, were given on-the-job training and assigned to the group statistical offices. Airmen positions were filled where possible from general clerical SSN's, but throughout the operation there remained a shortage of trained statistical clerks, SSN 212, and morning report clerks, generally SSN's 405 and 055. On the other hand, the replacement flow of experienced machine personnel was such that after activation of the 26th Statistical Control Unit with the 3rd Air Division in Burtonwood, England, USAFE was able to furnish the new SCU with approximately one-half of the airmen required, the majority of whom were machine operators.



AND TO MONITOR AIRLIFT ACTIVITY.

AIRLIFT REPORTS

In June 1948 air transport units of this command were required by then current directives to submit 192 different recurring reports. Of these, 42 were required by Headquarters USAFE, 20 by Headquarters USAF and Headquarters AMC, 88 by Headquarters EUCOM, and 42 by the Department of the Army.

Since the operation held the spotlight of world interest, additional flash reports were developed to feed the appetite of those hungry for information on its progress. Other new reports were developed to enable various echelons effectively to monitor the activity. Twenty two different reports peculiar to the Airlift were established, many were not new — some in a sense duplicated other standard reports, but differed in frequency or deadline or approach. A summary of the reports is contained in the accompanying tables.

REPORTING

Although certain special reports were required to record the status of the Airlift and its resources, much of the data necessary was available from reports already established, such as the organization morning report and the aircraft "110" report. Coupled with such standard reports, the processing facilities provided by punch-card tabulating equipment at Headquarters USAFE saved countless administrative man-hours which would otherwise have been expended by every Airlift unit in preparation, audit, and consolidation of additional reports.

When atmospheric disturbances during the spring of 1949 resulted in "garbling" of many statistical reports during transmission, the necessity of retransmission was minimized by air mailing "hard copies" of the transmitted messages as confirmation. An interesting by-product of this procedure was a reduction in the number of retransmissions which had previously been required because of non-receipt by the addressee due to misrouting or delay within the receiving headquarters.

The speed with which the build-up of the Airlift progressed naturally created situations in which administrative

TITLE OF REPORT	RCS	DATE INITIATED	PURPOSE	FREQUENCY	REMARKS
Report of Cost of Operation Vittles	AF-FO-F25	July 1948	To furnish all echelons with Airlift costs by functional activity	Monthly	All costs of Operation Vittles reported in accordance with cost code. Prepared by all USAFE Installations.
Report of Officers completing Airlift Task Force and Short Term PCS Assignments	AF-AP-P183	February 1949	To furnish data on all officer personnel completing Airlift duty	Monthly	Name, grade, and AFSN of all officers completing Airlift duty, with total aircraft hours flown by type of aircraft during Airlift tour. Prepared by 1st ALTF from feeder reports from all ALTF bases. Discontinued 28 Jun 49.
Ten Day Summary Report of Operation Vittles	AF-SC-U20	July 1948	To furnish a 10-day consolidation of the Daily Vittles Report	Tri-Monthly on 10th, 20th and last day of each month	Consolidation of daily reports furnished Hq USAF on a 10-day basis. Prepared by Hq USAFE. Discontinued 21 Oct 49.
Daily Vittles Report	AF-SC-U21A	July 1948	To furnish all echelons with complete data on Airlift operations and resources	Daily	Covered all phases of Airlift Operation, including aircraft data and tonnage, and was broken down by (1) ALTF Aircraft data (2) Traffic data, (3) Remarks. Prepared by Hq USAFE. Discontinued 1 Oct 49.
Report of R-2000 Engine Status	AMC-SD-AE29A	January 1949	To furnish data on which Hq AMC could base total engine requirements	Daily from Organizations; Weekly to AMC	Total supplies of engines on hand, total engines enroute, and average hours on engines changed. Prepared by each installation operating C-54 type aircraft.
Great Falls RTU Graduates	USAFE-PA-P4	January 1949	To furnish Hq USAFE with Pilot information on all RTU graduates	Each graduation date	Information on total pilots fully qualified as 1st pilots and total potentially qualified as pilots and co-pilots. Prepared by Great Falls. Discontinued 1 Sept 49.

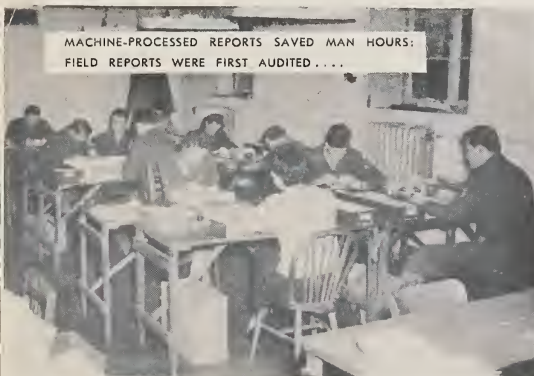
TITLE OF REPORT	RCS	DATE INITIATED	PURPOSE	FREQUENCY	REMARKS
Retention Status Great Falls Air Crew Members	USAFE-PA-P6	March 1949	To determine number of officers desiring retention past 6 months.	Monthly	Names of all officers desiring retention past 6 months. Prepared by Hq 1st ALTF. Discontinued 1 Sep 49.
R-2000 Engine Change Report	USAFE-SM-A2	October 1948	To furnish detailed data on R-2000 Engines.	Daily	Serial number, type, hours since last overhaul, date, and explanation of each overhaul. Prepared by all Installations operating C-54 Aircraft. Discontinued 16 May 49.
Removal of Parts on Disabled C-54 Aircraft	USAFE-SM-A4	January 1949	To furnish data on C-54 parts cannibalized.	As Required	Detailed information on usable parts of cannibalized C-54 aircraft. Submitted by ALTF bases and Erding Air Base.
Critical C-54 Supplies	USAFE-SM-A3	November 1948	To furnish C-54 parts information in order to facilitate requisitions from ZI.	Daily	Status of C-54 parts on hand, on requisition, due out, consumed, and reparables received daily at C-54 bases. Prepared by all USAFE bases operating C-54 type aircraft. Discontinued 15 Feb 49.
Departure of C-54 Aircraft	USAFE-SM-A12	September 1949	To furnish MATS with advance requirements for ferry crews on C-54 aircraft returning to ZI.	Daily	A 24-hour forecast of C-54 aircraft completing inspection at Burtonwood and departing for Rhein/Main. Applicable only to 3rd Air Division. Discontinued 18 Oct 49.
Weekly Activity Report	CALTF-CR-C4	October 1948	To gauge number of and time required for 200 hour inspections of C-54 type aircraft.	Weekly	Number aircraft (C-54) released from 200-hour inspection during week, number aircraft on backlog during week, average time required to accomplish 200-hour inspection. Required from Burtonwood Crew Control Officer.

TITLE OF REPORT	RCS	DATE INITIATED
Hourly Progress Report	CALTF-CR-C6	August 1948
Report of Field Grade Officers	CALTF-AP-1	November 1948
Manning Charts	CALTF-AP-5	January 1949
Dependent Housing Status Report	CALTF-SD-H1	March 1949
Maintenance Control Report	CALTF-MD-1	August 1949
Monthly C-54 Aircraft Maintenance Record	CALTF-MD-A6	February 1949
Weekly Personnel Strength Report	CALTF-SC-2	March 1949

PURPOSE	FREQUENCY	REMARKS
Determine tons by air	Hourly	Number of flights attempted, number flights completed, and tons carried. Required from all stations except Celle.
Determine assignment and distribution of grade officers	Monthly	Name, rank, primary and duty SSN of all field grade officers. Report required from all stations except Celle and Fassberg.
Determine personnel power requirements	Tri-Monthly	Statistics of assigned and authorized personnel by function and organization. Required from all stations except Celle and Fassberg.
Determine current status of dependent personnel	Weekly	Housing authorized, assigned, and available, by districts. Districts were broken down by distances from bases as follows: (1) 5 miles from base. (2) 10 miles from base. (3) 35 miles and above from base. Required from all stations except Celle.
Determine number of aircraft available	Daily	Number aircraft allocated, assigned, departed for ZI, arriving from ZI, in commission, and AOCP. Required from all stations.
Determine overall maintenance status of type aircraft	Monthly	Summary for month of total aircraft in commission, AOCP. Required from all stations except Celle.
Determine current personnel requirements	Weekly	Personnel status summary by primary and duty SSN. Required from all stations.

TITLE OF REPORT	RCS	DATE INITIATED	PURPOSE	FREQUENCY	REMARKS
Daily Operational Statistical Summary	CALTF-SC-3	July 1948	To furnish a complete overall statistical status of personnel, aircraft, and tonnage	Daily	Personnel authorized, assigned, aircraft in commission, AOCP, tons moved, number flying trips made, and aggregate flying time in hours. Required from all operational groups.
Report of Airlift Phase-out	CALTF-SC-5	August 1949	To determine rate phase-out was accomplished	Daily	Number of personnel transferred and number remaining. Equipment and supplies, in tons shipped, and number tons remaining to be shipped. Required from Celle and Fassberg.
Monthly Report on V. D.	CALTF-AS-M1	July 1949	To determine V.D. status of Airlift personnel	Monthly	Number cases V. D. and rate.
Weekly Airborne Electronics Equipment Outage Report	CALTF-CO-3	July 1949	To determine types of airborne electronics equipment with largest number of failures and outages	Weekly	Failures and outages by type of airborne electronics equipment.
Ground Training Progress	CALTF-CT-1	May 1949	To gauge overall accomplishment of training in accordance with USAFE Reg 50 Series (50-1, 50-6, 50-6A, 50-7, 50-9)	Monthly	Consolidated report of all training accomplished as required in USAFE Regs 50 series. Included number personnel that completed and number to complete courses such as military justice, sanitation, care of ammunition and equipment, personal hygiene, camouflage, intelligence, communications, and basic infantry indoctrination.

accuracy and completeness had to be sacrificed to meet the deadlines set on operational directives. A great many of the difficulties which developed as a result of this compromise were encountered in the reporting field of administration. As is evident from another section of this publication, the administrative complications did not initially impede the material progress of the operation as a whole, nor should they detract from the splendid overall record of achievement of the organizations involved. There is no doubt, however, that the lack of adequate information was in many instances an impediment to staff planning, and that deficient administrative procedures more than once exercised a depressing influence on morale.



MACHINE-PROCESSED REPORTS SAVED MAN HOURS:
FIELD REPORTS WERE FIRST AUDITED . . .



... DATA WAS THEN CONVERTED TO PUNCH-CARDS . . .

Analysis of the factors involved indicates that much of the confusion could possibly have been prevented by advance knowledge of specific potential problems. Preventive rather than remedial action might then have been taken. It is with this thought that the problems are analyzed in the following pages.

PERSONNEL ACCOUNTING

The business of accounting for Airlift personnel was a complicated one. As discussed in detail in another chapter, personnel came individually and as organizations; by water and by air; on regular orders, operational orders, and even on VOCO, from all over the world. A large number arrived without any records.

Personnel who travelled to USAFE as individuals were often under orders which were ambiguous, obscure, or incorrect. There were cases of orders which assigned personnel directly to USAFE organizations, to Army stations, and even to geographic locations, all in conflict with Air Force regulations requiring transfer of personnel through specified AF accounting units. During the first few months some trouble was experienced at air ports of debarkation; incoming personnel often left the base without reporting to the accounting unit, and similarly, sometimes were

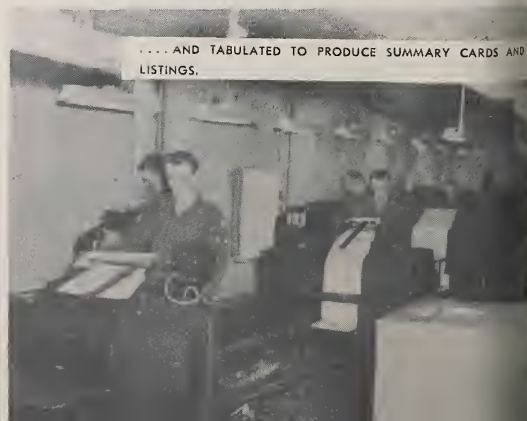
present at their duty stations for several days before being accounted for on any strength report. This situation resulted from insufficient dissemination of instructions and lack of definite control of incoming personnel. In order to obtain complete and accurate strength information, it was necessary to compare personnel accounting records with those of the billeting offices, finance offices, and agencies issuing Post Exchange permits. Subsequent establishment of stringent controls at debarkation ports eliminated most of those difficulties.

By far the greatest problem in personnel accounting was that resulting from the large number of personnel on temporary duty (TDY) from other commands. While the nature of the emergency made this large mass movement necessary, the uncertainty of its duration made permanent changes of assignment appear impracticable.

Since normal accounting procedures were not fully applicable to attached personnel, there was initially no attempt to maintain complete punch-card records on these TDY personnel. It was not long, however, until a definite need for certain information was apparent. Mail delivery and personal correspondence required locator service. Housing facilities, ration requirements, and other logistical planning were necessarily based on total numbers of personnel regardless of attached or assigned status.



... CARDS WERE SORTED IN REPORT SEQUENCE.



... AND TABULATED TO PRODUCE SUMMARY CARDS AND LISTINGS.

The initial attempt at solving this problem was the formation of provisional organizations at all stations to account for TDY personnel. Due primarily to lack of administrative control at wing level, however, these provisional units proved inadequate and were discontinued in December 1948. In lieu thereof, each USAFE organization with personnel attached from other commands submitted an initial roster containing information on TDY personnel normally maintained by statistical services only on assigned personnel. Thereafter each organization was charged with the responsibility of accounting for this type of personnel on a special section of the morning report designated as "Section V." The Section V morning report was processed by statistical services just as were regular morning reports. From this information, verified by a "head-count" 10 January 1949, punch-card status files on TDY personnel were established and maintained in the same manner as on assigned personnel until the end of the Airlift.

The experience of this command indicates that certain complications are likely to arise through the presence of large numbers of TDY personnel within a command. Many of these situations can be controlled, corrected, or even eliminated by the use of PCA rather than TDY, by more stringent accounting procedures for TDY personnel, and

by the effective use of the control data available through the statistical services personnel reporting system. The more important of these potential problems are as follows:

- (1) The lack of records and the increase in workloads for which no additional administrative personnel are authorized will probably result in a substantial increase in the number of morning report errors and will inevitably delay the preparation of personnel reports at every level.
- (2) Movement of individuals on multiple TDY between organizations, particularly on verbal authority, may result in "cross-shipment" of personnel in the same SSN's between two bases.
- (3) Upon expiration of their tour of service, TDY personnel may be discharged and reenlisted by the organizations to which they are attached, without proper coordination with the organizations of assignment.
- (4) Attached individuals may be retained past the date of expiration of their term of service.
- (5) An individual who has been on an extended period of TDY may at the expiration of the TDY period be erroneously returned to his former base after his organization has been moved to another base.

Personnel reporting problems are especially significant during a period of major reorganization and redeployment such as the Airlift phase-out. Unless care is exercised in establishing the sequence in which individuals leave their organizations, a shortage of reporting and administrative personnel (due to early out-shipment) may occur at a time when the need for these specialists is greatest. Personnel accounting records must balance as certainly as supply records; and accuracy in the initial stages of personnel actions and reporting will save immeasurable time and effort which would otherwise be required in subsequent analysis to locate the errors, amend or rescind special orders, and make corrections to morning reports and other basic records.

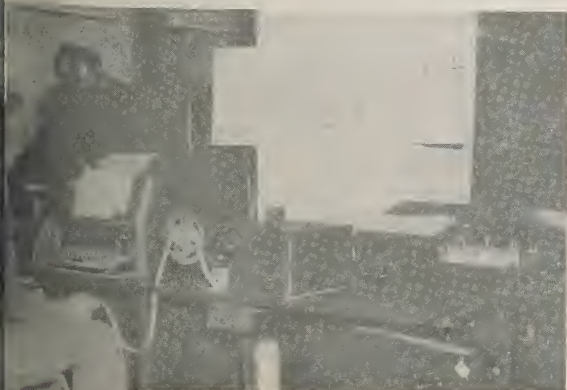
AIRCRAFT AND OPERATION REPORTING

When the Airlift began, Aircraft Status and Operation Reports (commonly referred to as "110 reports") on other than USAFE aircraft were sent to the organizations to which the aircraft were assigned (Japan, Alaska, MATS, etc.). Until December 1948, the majority of these commands were credited with the flying time of their respective aircraft. In late 1948, however, the continuing nature of the operation caused a policy change whereby the aircraft were gained by USAFE on the newly established aircraft "MTV" (Military Transport Vitriles) 110 report. Aircraft from the Far Eastern Air Force were the only ones transferred prior to December, their flying time being reported to this command beginning in October 1948.

In the expectation of an operation of short duration, the Airlift staff initially procured operational control reports on verbal authority and later on letter authority. It was many months in some cases before printed directives covering the reports were issued. This was a factor in the creation of duplicating and overlapping reports.

Initial aircraft and flying time data were obtained from a number of sources. The major ones were the 110 report prescribed by USAF and the "Daily Operational Status Summary", CALTF-SC-3, a flash report developed by Headquarters CALTF and used as the basis for the operations report submitted by USAFE. Extracts of the latter report were submitted to other interested agencies such as OMCUS Berlin, Headquarters EUCOM, and the US Attache in London.

For various reasons, the cut-off time of the CALTF-SC-3 was set at 1200 hours, in contrast to the 110 report cut-off time of 2400 hours. This 12-hour difference allowed only an estimated comparison. Since some of the information, such as flying time and gasoline consumption, was duplicating in nature, and since the extremely tight deadline set by Headquarters USAF for the Daily Vitriles Report



TELETYPE TAPE PREPARED FROM SUMMARY CARDS WAS USED TO DISPATCH THE REPORT.

necessitated estimates of certain data, there were constant discrepancies in the overlapping information which caused trouble throughout the operation. The problem was accentuated by a difference in some of the definitions used in the two reports, such as those for "available aircraft" and "crew utilization". Variations in the sources of data required constant monitoring by every statistical services office.

The collection, audit, and submission of the Daily Vittles Report was an example of almost unbelievably swift reporting. The report was quite detailed, including a number of items by squadrons and groups on aircraft, crews, maintenance personnel, operational data, accidents, type of tonnage hauled, loading times, fuel consumption, and other variables. The consolidated report was required to be dispatched from USAFE Headquarters at 1600 hours, only **four hours** after the cut-off. Obviously, to meet such a schedule required minute-by-minute planning on the part of all personnel engaged in collecting and assembling the information.

Extreme care in the control of Airlift reports and reporting sources eliminated several potential problems. For example, early in the Airlift, OMGUS in Berlin received overlapping operational reports from seven different sources: The three airfields in Berlin, Headquarters 1st ALTF, Headquarters USAFE, the EUCOM Office of the Transportation Corps, and Headquarters Berlin Sector. Reports from the West were based on take-offs and those from Berlin on landings. Aircraft in the air at cut-off time were enough to cause considerable differences among the reports. Such situations led to the establishment of Headquarters USAFE as the single source of statistical information on the operation.

Certain problems arose, too, in the mechanics of collection of aircraft and operational cost data. The fuel and lubrication figures reported were weakened by inadequate fuel measurement facilities at bases. Further, it was impossible to use normal consumption data as criteria, because of the irregular waiting periods before take-off. AF Forms 1A were sometimes improperly completed because of weather, abnormal operation schedules, or carelessness.

Coordination of aircraft transfers was difficult. An air-

craft delivered by the crew of the losing organization was that organization's responsibility until delivery. Losing activities, however, had difficulty in preparation of correct data on flying time and gasoline consumption, since Forms 1A remained with the aircraft and the procedures established for the return of necessary information to losing units were inadequate.

During the phase-out period there were numerous transfers in preparation for shipment of aircraft to the United States, and gaining organizations sometimes received aircraft without AF Forms 1A and other important records. The deterioration in the quality and timeliness of reports submitted by organizations involved in the phase-out indicated a general reduction in the sense of responsibility among personnel who were scheduled to leave the Airlift. Such problems multiplied the difficulties which confronted the small and sometimes inexperienced group of personnel who were left to clean up loose ends and submit the final phase-out reports.

CONCLUSIONS

In reporting the Airlift certain techniques and policies proved their worth. Others were modified and used successfully; still others were found wanting.

There are several points of view as to the most preferable method of administering such a project. Although the establishment of a sub-command solely responsible for an Airlift operation has its advantages, from the standpoint of statistical services it would be more efficient if no separate command were established. Statistical services in the major headquarters could carry out its function with very little increase in personnel — only a fraction of the number required for a separate command. The problem of coordination would be reduced, along with the duplication of effort which stems from parallel functions.

The taxpayer's dollar could certainly be stretched by adoption of stringent administration in closing out activities. The tendency so evident in 1945 and again in the Airlift phase-out was to "drop it and get out". Therefore, it is strongly recommended that any individual who has departed without having properly completed his duty be

subject to a "call back" for a definite period of time. This period should be sufficient for the records to be cleared, perhaps 60 to 90 days, and the call back should apply to military personnel and civilians alike. Any necessity for such action should be registered in the individual's personal efficiency file.

RECOMMENDATIONS

The following specific recommendations represent gains in reporting experience believed valuable enough to make a matter of record:

Personnel moving to or from an overseas command for a period of duty of 45 days or longer should in all cases possible be moved on a permanent change of assignment (PCA).

Movements to or from an overseas command should never be made solely on VOCO or operational orders. If PCA movement is not practicable, individuals should be placed on **detached service** rather than on **temporary duty**.

Suitable, adequate accounting procedures for detached service personnel should be established worldwide.

The integrity of a wing-in-being contributes to its administrative efficiency and should be carefully considered prior to separate assignment of its elements.

Officers and airmen, regardless of career field, should all have a fundamental knowledge of reporting and administrative procedures. Service schools should emphasize the importance of proper administration and its relation to and effect on the primary mission. PIO agencies can aid in making personnel administration-conscious.

Special reports developed for an operation should largely be based on existing standard reports, with such supplementary requirements as are necessary.

To eliminate inconsistent information, operations reports should normally be released to outside agencies through one central source — the major command headquarters.

Report deadlines should be established to obtain maximum value from the reports. Accuracy and speed are conflicting factors which must be resolved.

Berlin Airlift Chronology

1 APRIL 1948

Rail and road traffic restrictions from British and U. S. zones to Berlin imposed by Soviet authorities.

20 JUNE 1948

Currency reform initiated for Western zones of Germany and Western Sectors of Berlin. Soviets protested action and refused to join plan.

22 JUNE 1948

Autobahn closed to Allied vehicular traffic to and from Berlin on Soviet contention that Marienborn bridge required repairs. Soviets announced new separate currency reform.



23 JUNE 1948

Soviets suspended all travel and traffic into Soviet zone. Soviets asserted that Berlin was part of the Soviet Zone of Occupation.

25 JUNE 1948

Soviet authorities announced they would not supply food to Western Sectors of Berlin.

26 JUNE 1948

Operation of full-scale airlift to Berlin became the sole supply source for 2,500,000 persons in Western Sectors and for Western occupational personnel. Limited airlift had augmented military supply stocks since 1 April.

AIRLIFT STARTED 26th



JUNE

C-54's JOIN
AIRLIFT OPERATION



JULY

USAF OPERATES FROM
BRITISH ZONE BASE



AUGUST

C-82's ARRIVE FOR
AIRLIFT OPERATION



SEPTEMBER

MILLIONTH TON FLOWN
TO BERLIN



FEBRUARY

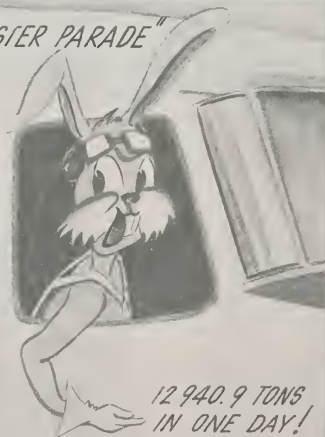
MORE
COAL

MORE
FOOD

FLOWN

MARCH

"EASTER PARADE"



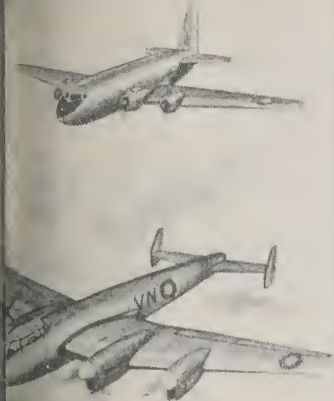
APRIL

BLOCKADE LIFTED 12



MAY

ITF GOING FULL BLAST



OCTOBER

AIRLIFT DEFEATS WEATHER



NOVEMBER

OPERATION SLEIGH BELLS



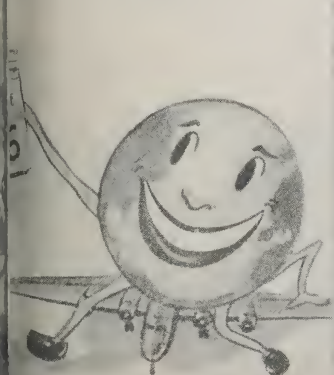
DECEMBER

AIRLIFT PERMITS
FOOD RATION INCREASE



JANUARY

1st ANNIVERSARY
OF THE AIRLIFT



JUNE

2,000,000th TON FLOWN



JULY

PHASE-OUT OF VITTLES
BEGINS



AUGUST

LAST FLIGHT FLOWN
ON AIRLIFT



SEPTEMBER

29 JUNE 1948

USAFE announced the formation of Berlin Airlift Task Force.

1 JULY 1948

First C-54 aircraft joined Airlift.

7 JULY 1948

First coal flown to Berlin, packed in duffel bags for industrial use.

29 JULY 1948

USAFE announced establishment of the Airlift Task Force (Provisional) which replaced Berlin Airlift Task Force organization.

14 AUGUST 1948

C-74 Globemaster aircraft arrived at Rhein/Main Air Base, making 24 trips to Berlin before returning to the United States in September.

21 AUGUST 1948

First USAF aircraft flown from Fassberg RAF Station to Gatow RAF Station in Berlin. Fassberg used as coal supply point because of strategic location between the Ruhr and Berlin.

14 SEPTEMBER 1948

Five C-82 aircraft "Flying Boxcars" joined Airlift. They carried bulky items and heavy engineering equipment unsuitable for C-54 transport and flew automobiles from Berlin to Rhein/Main and Wiesbaden Air Force Bases.



18 SEPTEMBER 1948

USAFE celebrated Air Force Day with an all-out Airlift effort, and with RAF participation hauled 7,058 tons to Berlin for distribution to Western Berliners as a special bonus.

1 OCTOBER 1948

All C-47 aircraft replaced by C-54 aircraft on Airlift.

15 OCTOBER 1948

Merger of USAF-RAF Airlift elements into one organization designated Combined Airlift Task Force (CALTF).

5 NOVEMBER 1948

Dedication of Tegel Airfield in French Sector of Berlin, third major airfield in Berlin area.

8 NOVEMBER 1948

First Naval transport aircraft arrived at Rhein/Main for participation in Airlift.

16 DECEMBER 1948

First USAF aircraft operated from Celle RAF Station

18 DECEMBER 1948

Tegel Airfield in Berlin opened for full operation.

31 DECEMBER 1948

100,000th Airlift flight arrives in Berlin.

19 JANUARY 1949

Food ration for West-Berlin is raised from 1,600 to 1,880 calories a day.





18 FEBRUARY 1949

1,000,000th ton is landed in Berlin by a British York aircraft loaded with potatoes.

8 MARCH 1949

Six ambulances for Western Sector public health services are flown into Berlin.

16 APRIL 1949

Special Airlift effort, "Easter Parade," shattered all tonnage records by lifting 12,940.9 tons of food and coal supplies in a 24-hour period.

4 MAY 1949

C-97 Stratoliner aircraft flew first "payload" to Berlin. Aircraft retained for special Airlift operations.

12 MAY 1949

Soviet announced lifting of the Berlin Blockade.

28 MAY 1949

Rail traffic to Berlin halted by Soviets, allegedly because of elevated railway (S-Bahn) strike.

7 JUNE 1949

Airlift allocated eight tons of first-class mail daily due to reported Soviet censorship.

RESTRICTED

26 JUNE 1949

First anniversary of Berlin Airlift. Lift ordered continued until reserve supply stocks reached satisfactory level and international situation clarified.

29 JUNE 1949

Rhein/Main Air Base converted to coal shipping point for Airlift. RAF lifted food only from British bases at Wunstorf and Fuhlsbuttel.

29 JULY 1949

Memorial ceremony held at Fassberg RAF Station for Airlift dead by British, French, and United States forces.

30 JULY 1949

Official announcement of termination of Berlin Airlift on 31 October 1949.

31 JULY 1949

317th Troop Carrier Group at Celle RAF Station flew final mission with ten tons of coal. Flights of U. S. Naval Air Transport Squadrons VR-6 and VR-8 discontinued at Rhein/Main Air Base.

Record tonnage of 253,000 short tons of coal, food, and supplies lifted by CALTF in July. Previous record was 250,818 tons in May.

3 AUGUST 1949

First C-54 aircraft left Rhein/Main for United States under Operation VITTLES phase-out plan.

25 AUGUST 1949

U. S. Navy Transport Squadrons VR-6 and VR-8 relieved from attachment to 1st Airlift Task Force.

26 AUGUST 1949

Wunstorf Airfield (RAF) in British zone closed. Total Airlift flights 38,663 transporting 316,927.9 tons to Berlin.

27 AUGUST 1949

313th Troop Carrier Group at Fassberg RAF Station flew last Airlift mission. Total Airlift flights 51,995 transporting over 500,000 tons.



1 SEPTEMBER 1949

Headquarters, Combined Airlift Task Force inactivated at Wiesbaden, Germany.

6 SEPTEMBER 1949

Participation of 1st Airlift Task Force in EUCOM Fall Training Maneuver, Exercise HARVEST, from 6-16 September 1949 in troop carrier role.

18 SEPTEMBER 1949

Celle RAF Station discontinued as USAFE Airlift base.

24 SEPTEMBER 1949

Memorial ceremony at Camp Lindsey, Wiesbaden Military Post, for thirty-one USAF, U. S. Navy and U. S. civilian Airlift dead. Camp streets renamed for deceased personnel.

27 SEPTEMBER 1949

Fassberg RAF Station discontinued as USAFE Airlift base. 60th Troop Carrier Wing, Heavy, transferred from Fassberg to Wiesbaden Air Base, effective date 1 October 1949.

30 SEPTEMBER 1949

End of Operation VITTLES. Last C-54 left Rhein/Main for Berlin at 1845 hours, ending Airlift one month ahead of schedule due to sufficient food stockpiles in Berlin.

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